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## TABLE OF CONTENTS.

	PAGE.
GONDORIZ ON THE UNITED STATES RUBBER CO.	J. Orton Kerbey. 257
HOW RAILROAD COMPANIES BUY RUBBER GOODS.	L. A. Sherman. 259
THE CHEMISTRY OF RUBBER INGREDIENTS AND ADULTERANTS, IV. Sulphur.	Henry J. Williams. 262
TOPICS FOR RUBBER MANUFACTURERS:	269
Aluminum for Hose Couplings.	265
Manufacture of Rubber Cements.	265
Vermilion in Rubber Manufacture.	266
Stopping Holes in Rubber Goods.	266
India-Rubber in Chewing Gum.	267
Iron Rubber-Shoe Lasts Abroad.	267
Aluminum Boot-Trees and Lasts.	270
RECENT RUBBER PATENTS.	269
ELECTRICITY IN THE HARDWARE STORE.	Herbert Laws Webb. 271
POINTS IN THE MANUFACTURE OF RUBBER FOOTWEAR. (Illustrated.)	273
THE "TIRE AGE" IN BICYCLES.	274
CUTTING RUBBER-SOLES BY MACHINERY (Illustrated)	277
PROGRESS OF THE RUBBER COMBINATION.	284
EDITORIAL:	
A Great Editor on Rubber.	275
Rubber-Shoe Production in Massachusetts.	276
New Publications.	276
NEW GOODS IN THE MARKET (Illustrated):	
Champion Chest-Expander.	278
Arc Lawn-Sprinkler.	278
"The Ideal Hygiene" Feeder.	278
Darling's Patent Inkstands.	278
A Rubber Aid to Hearing.	278
Ladies' Inverness Mackintosh.	279
A Convenience to Horse and Driver.	279
Rival Lawn-Sprinkler.	279
Bailey's "Perfection" Rubber.	280
Enterprise Lawn-Sprinkler.	280
The Welch Inhaler.	280
MISCELLANEOUS:	
Quality of Rubber Jar-Rings.	264
Tests of Rubber Belting.	264
A Change in Methods of Distribution.	268
Rubber Tennis Soles by the Thousand.	268
Colorado Ladies Wear Rubber Shoes.	268
Notes on African Rubber Plants.	270
A Rubber Cushion in Water-Wheel Buckets.	270
The Decay of India-Rubber.	272
An Arrow that is Feathered With Rubber.	272
Accidents in Rubber-Mills.	272
It is Very Injurious.	272
The Tennis-Shoe in England.	273
Rubber-Goods Exports from New York.	276
Fraud in Pará Rubber.	280
TRADE AND PERSONAL NOTES.	281
REVIEW OF THE RUBBER MARKET.	286

## A Great Editor on Rubber.

IT is a favorite diversion with the editors of some great newspapers to ridicule the idea of establishing "schools of journalism" on the plea that the work in their profession is of such a character that it can be learned only through contact with the practical affairs of life. It is a reasonable theory that the editorial art cannot be mastered in class-rooms alone; on the same theory intending practitioners of medicine are denied their diplomas until they have experimented for the proper length of time on the helpless inmates of hospital wards. But it may be submitted that the narrow confines of some editorial offices seem scarcely better fitted than the lecture-room of a "professor of journalism" for placing beginners in newspaper work in touch with "the practical affairs of life." The broad intelligence, the tireless energy, the fertility of resource, the liberality of expenditure of the modern newspaper are marvelous. But at the same time the newspaper lacks symmetry in that all the departments are not conducted with equal skill.

Reports of proceedings in political conventions and of details in a base-ball match may be relied upon so implicitly that if the report be read in one morning journal it is unnecessary to take up another paper to see whether the news is verified. When it comes to news from trade and industrial circles, however, the impression most often conveyed is that the writers have been very far removed from sources of information. It is as if no knowledge of facts was considered necessary in writing of such a subject as a "rubber trust" or the building of tin-plate mills or the cordage manufacturing business. The reader employed by THE INDIA RUBBER WORLD to keep a watch for references to the rubber interest in the newspapers finds many things of interest on account of their absurdity, but seldom a line betraying intelligence or a statement conveying information of value. It may be urged by editors of public journals that the general interest in this particular industry does not justify the employment of an editor or reporter who is familiar with the subject. Then why trouble the public with anything on the subject?

These remarks have been suggested, in part, by the appearance in a leading Chicago daily journal of an editorial article, written in a tone of superiority implying a desire not only to give its readers information of value, but also to correct misconceptions which other newspapers, not so well informed, may have given rise to. Our contemporary begins in a spirit of facetiousness by saying that India-rubber "is not picked from vines" nor "dug from the ground," as "some innocents may imagine," but that it is derived from "a tree of the family *Euphorbiaceae*." The botanical phrase is all right, but it happens that caoutchouc is the product of more than one family of plants. The natural order *Apocynaceae* might be mentioned, for instance, embracing the genus *Landolphia*, of which no less than seventeen species have been reported, some of which have great importance as rubber plants. It may be mentioned that rubber from this source is "picked from vines." Rubber is also "dug from the ground" in Africa. In a re-

cent report to the Department of State in Washington the Consul at Loando reports a three-fold increase in the rubber exports from the port of Benguela during five years, as the result of the discovery of a new source of supply in the district of Bihée, being nothing more nor less than a tuber, resembling a large potato, from which a good quality of rubber is produced. The last report from Benguela showed a total export of rubber for one year of 2,500,000 pounds.

Our contemporary is not more accurate when it turns from lighter to more serious vein, as witness the assertion:

"France seems to be in the ascendent in the manufacture of all kinds of rubber goods, the total value of home consumption and export per annum being perhaps \$28,000,000."

We presume that this editor has never taken the trouble to learn that 60 per cent. of all the rubber shipped from Pará comes direct to this country, besides half as much from other countries; that the first cost at wholesale of the raw rubber imported in the United States is \$18,000,000 a year, and that rubber forms but a small proportion of many classes of rubber goods of the finest quality—as waterproof garments and fire-hose. The rubber-shoe production alone in the United States far exceeds the whole rubber interest of France. For that matter, both Great Britain and Germany totally eclipse France in the extent of their rubber industries.

#### Rubber-Shoe Production in Massachusetts.

THE extent of the manufacture of rubber shoes in Massachusetts during 1891 forms the subject of a letter from the Hon. Horace G. Wadlin, Chief of the Bureau of Statistics of Labor in that State, to the editor of THE INDIA RUBBER WORLD, under date of April 28. An annual census of manufactures in Massachusetts is taken by Mr. Wadlin's office, under a system so complete that the greater part of the details of each leading industry is reported fully. He states that the data filed in his office indicate the production of rubber shoes during the year to the value of \$12,775,000, which he believes to represent 90 per cent. of the total product in the State. The total product, upon the basis of this report, may be estimated therefore at \$14,052,500. The capital invested in the concerns reporting aggregates, in round numbers, \$8,600,000. Besides the three establishments making rubber shoes solely, Mr. Wadlin states that at least two other concerns make shoes in connection with other lines of rubber goods.

#### New Publications.

LE CAOUTCHOUC ET LA GUTTA-PERCHA. BY E. CHAPEL. WITH preface by P. Schützenberger. 245 illustrations. Paris: Marchal & Billard. (8vo, 615 p., 20 francs.)

M. CHAPEL has made a very extensive and complete monograph of caoutchouc and gutta-percha. This book, devoted to an industry which has rapidly become one of the most important in France as well as elsewhere, is the work of a manufacturer whose competence for the task is indisputable. In it he treats successively of the botanical origin of the raw material, of the methods of gathering it, of its properties and composition, of its applications, and of the methods of manufac-

ture. Finally he deals with the present conditions of the rubber and gutta-percha industry and trade in France. Botanists will read with great interest the pages devoted to the origin of rubber and the methods of gathering it. The extreme variety of the uses to which elastic substances are now put is surprising, and the author of this volume has enriched technology with a work of the most important character.

KEY TO STEAM ENGINEERING. BY A PRACTICAL ENGINEER OF Large Experience. Third Edition, Revised and Enlarged. Boston: Henry S. Williams. [16 mo, flexible cloth, 174 p.]

THIS little book presents in a simple, compact, and easily comprehensible way a large amount of information of great usefulness to the practical engineer. The first section is written in the form of a catechism, and answers nearly every important question that can be asked concerning the steam-engine and boiler. The second section deals with the combustion of coal in its chemical and practical aspects, and the third section with the various states of water and the phenomena of vaporization, ebullition and evaporation. A brief appendix gives definitions of the most important technical electrical terms and sundry useful tables and formulæ. Written in an every-day style for every-day men, it ought to find a ready sale.

WE are indebted to Charles A. Fawsitt, F. R. S. E., F. C. S., of Glasgow, Scotland, for a pamphlet containing a reprint from the *Journal of the Society of Chemical Industry* (April 30, 1892) of his paper on "The 'Dry Heat' Vulcanization of Rubber, with Special Reference to the Use of an Improved Vulcanizer."

#### Rubber-Goods Exports From New York.

THE declared value of exports of "India-Rubber Goods" from the port of New York since our last report—for the five weeks ending May 31, 1892—is shown in the following table, together with the total value of similar exports from the beginning of the year. It may be mentioned that exports of rubber goods from New York amount to about 53 per cent. of the total shipments of such goods from the United States.

To—	Five Weeks.	Since Jan. 1.	To—	Five Weeks.	Since Jan. 1.
Amsterdam.....	71	\$ 182	Genoa.....	—	\$ 2,578
Antwerp.....	2,217	8,328	Gijon.....	—	8
Argentina.....	—	60	Glasgow.....	—	1,300
Barcelona.....	96	96	Hamburg.....	5,188	13,837
Belfast.....	294	294	Havre.....	5,851	50,302
Berlin.....	382	1,720	Hayti.....	220	627
Bolivia.....	800	2,185	Hong Kong.....	—	464
Bolton.....	—	58	Japan.....	2,551	7,653
Brazil.....	741	6,911	Leipzig.....	—	179
Bremen.....	559	2,244	Liverpool.....	580	4,618
Bremerhaven.....	316	316	London.....	1,291	8,773
British Africa.....	51	291	Marseilles.....	275	1,278
British Australia.....	783	9,202	Mexico.....	1,906	9,138
British Honduras.....	32	101	Moscow.....	—	3,062
British E. Indies.....	8	136	Newfoundland.....	30	476
British W. Indies.....	153	1,307	New Zealand.....	—	212
Brussels.....	570	570	Nuremberg.....	361	361
Budweis.....	—	432	Oporto.....	1	1
Central America.....	856	4,670	Peru.....	144	691
Chemnitz.....	53	53	Philippines.....	—	85
Chili.....	830	1,849	Porto Rico.....	63	567
China.....	64	64	Rotterdam.....	4,116	6,903
Christiania.....	214	1,159	Sau Domingo.....	23	66
Colombia.....	642	2,659	Sandwich Islands.....	—	152
Constantinople.....	—	55	St. Gall.....	—	298
Copenhagen.....	350	2,493	Uruguay.....	185	145
Cuba.....	1,879	8,383	Venezuela.....	666	2,180
Danish W. Indies.....	51	143	Vienna.....	214	428
Dutch E. Indies.....	8	122	Zurich.....	25	253
Dutch W. Indies.....	94	287			
Ecuador.....	—	453	Total.....	\$35,865	\$172,739
French W. Indies.....	—	15			

The value of crude India-rubber exported from New York during the same period of five weeks is given in the next table:

To—	Packages.	Value.	To—	Packages.	Value.
Antwerp.....	20	\$ 300	Havre.....	95	\$ 1,100
Bordeaux.....	100	1,000	Liverpool.....	90	1,500
British Australia.....	2	125	London.....	566	45,643
Genoa.....	184	2,000			
Hamburg.....	152	3,500	Total.....	1,299	\$ 57,568

Exports of India-rubber scrap were made to Glasgow to the value of \$1219; to Havre, \$1661, and to Liverpool \$180.

## CUTTING RUBBER-SOLES BY MACHINERY.

IN the year 1888 a young man who was somewhat familiar with the work in rubber-shoe factories patented a machine for cutting rubber soles. Prior to that time all such work had been done by hand and the conservative predicted that it could not be successfully done in any other way. They were rejoiced, therefore, when the machine was found to be a partial failure, and of course said "I told you so." The inventor, however, believed that he had a principle that was worth something, and so did the gentlemen who were backing him, and they went ahead experimenting and improving. Finally the inventor became weary and turned his attention to other matters; but the company engaged

one of the most accomplished mechanical engineers in the country, and kept right on. For four years they worked, adapting, changing, inventing, experimenting, until finally success crowned their efforts and to-day a perfect machine is the result.

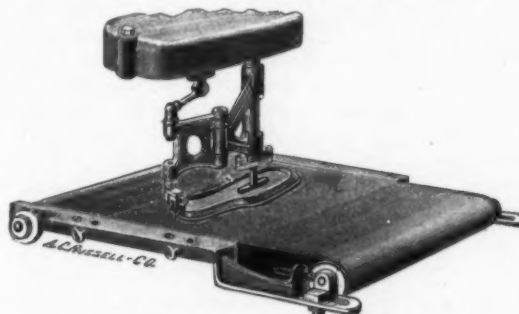
The first illustration of this machine ever made, the Wellman Sole-Cutter, manufactured in Boston, Mass., now appears in this journal. It is really a triumph of mechanical skill and as it will result in the production of better goods, and already makes a marked saving on the former hand

work, it will unquestionably drive the hand-cutter out of the field. Two sizes of machines are all that are required to cut all of the infinite variety of rubber soles that can possibly be called for. One machine running continuously on one kind of sole, would cut 17,000 pair a day and give exactly the same bevel to the stock in every instance, but in practice the number of soles cut per day (the machine running between seven and eight hours on various kinds and sizes of soles) has been only 4000 pair, owing to the impossibility of booking the cut soles as fast as the machine will produce them.

There are now nine machines in successful operation in rubber-shoe factories. By an automatic booking device

now being perfected, it is hoped that one man may be able to run two machines, and thus do better work and more of it than can a force of hand cutters. Without entering into a detailed description of the machine a few points of excellence may well be noted. It is exceedingly simple and wonderfully under the control of the operator. It takes less than one-eighth of a horse-power to run one. The main forms or sole patterns are cheap and never wear out. The cutting proper is done on the same form as is now done by the hand cutter.

To change one form for another occupies but a few seconds, and indeed no longer time to regulate the feed to any width of sole, from nothing up to seven inches. The soles are cut by a tiny knife that slips around the form on a bevel, and two machines will wear out a knife and a half a day. The machine always stops in one position with

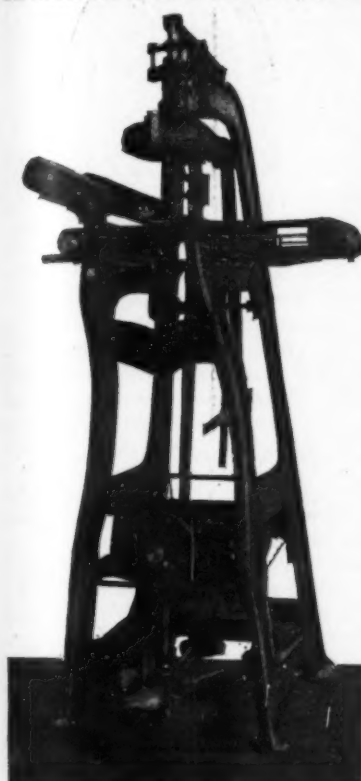


HEAD, CUTTING-ARM, FORM AND CUTTING-BELT.

the form directly above the rubber. The stock from which the soles are cut is fed in strips under the knife, and the knife, or the feed, or the whole machine can be instantly stopped at any point, or is arranged after it is once started to run alone without attendance until the strip of soling is consumed.

The knife cuts on a belt made of rag stock, and about one belt a day is used up. These belts are easily made and cemented together and cost practically nothing. In cutting, the largest runs are made in large soles, but it is a great saving of time and money to cut even the smallest of children's sizes in this way. The machines are put in on royalty, and orders are now booked far ahead for numbers of them to go to some of the best-equipped rubber-mills in the United States. The company have already made more than four hundred forms for different styles of rubber soles.

THE *Mexican Financier* of April 30 says: "In organizing the rubber trust the American manufacturers of rubber goods not only intend to control the price of their manufactured goods, but to fix the price of rubber itself. But where Baron de Gondoriz, and his 'Empressa Industrial do Pará,' with its \$25,000,000 capital, failed, the new rubber trust may also encounter unexpected difficulties for, as we understand it, the new trust is purely American in its composition, and will have no aid from Europe."



THE WELLMAN SOLE-CUTTING MACHINE.



## NEW GOODS IN THE MARKET.

VARIOUS kinds of pocket exercising articles have been invented from time to time, and some have been very popular. There are many who cannot afford to put up an expensive gymnastic apparatus, and to them some simple arrangement that enabling them to get the needed exercise is highly valued.

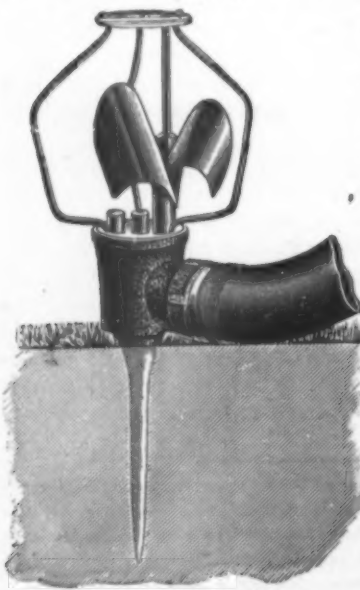


CHAMPION CHEST EXPANDER AND POCKET GYMNASIUM.

Among the best of these is what is known as the Champion Exerciser. It is made of a single cord of high-grade rubber, on each end of which is a wooden knob for grasping. As the rubber is very elastic and lively, the effort of stretching it in the various postures shown in the accompanying engraving affords a pleasant and healthful exercise. Many find its use before the morning bath extremely beneficial. It is made in five sizes—Nos. 1 and 2 for boys and girls, No. 3 for ladies and youths and Nos. 4 and 5 for grown men. It is highly recommended by physicians and athletes, and is manufactured by the Rubber Specialty Manufacturing Co., No. 16 Murray street, New York.

#### Arc Lawn-Sprinkler.

THE points of excellence possessed by the Bonnette Arc Lawn-Sprinkler, manufactured by the Detroit Sheet Metal and Brass Works, of Bay City, Mich., are numerous and important,



ARC LAWN SPRINKLER.

but its chief advantage lies in the fact that it will distribute the water over a circular or semi-circular area as may be desired. The problem of sprinkling lawns thoroughly without wetting walks is thereby solved. Moreover, it requires but five seconds to change from circular distribution to semi-circular, and *vice versa*. No water is wasted around the base of this machine, but it is all utilized in an even distribution over the entire surface, which varies from a circle of four feet in diameter to one of forty feet according to the water pressure. When the wheel shown in the accompanying cut is on the center post, the distribution is circular; when it is on either of the side posts, the distribution is semi-circular.

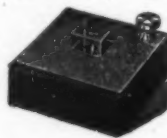
#### "The Ideal Hygiene" Feeder.

It is claimed by those who are authorities on the rearing of infants that colic and its attendant discomforts and complications often come from wind swallowed when feeding from an ordinary nursing bottle. As this is not conducive to health, a feeder that obviates it is very properly called the "Hygiene." This feeder has been endorsed by medical authorities as being a pronounced success, and second only to the mother's breast for rearing infants. The nipple, which is made of pure rubber, and which is large and made in a shape to imitate nature, can easily be turned inside out and therefore can be thoroughly cleansed. It is provided with a vent which opens only to admit air, thus preventing the child from swallowing wind while nursing. The bottle has a large neck, admitting the full stream of water from the faucet, making the cleansing of it an easy task. It has no corners or grooves in which the food can settle and sour, and is conveniently filled without the use of a funnel. Manufactured by the Ideal Rubber Co., Brooklyn, N. Y.



#### Darling's Patent Inkstands.

THE right to manufacture Darling's Patent Inkstands has been purchased from the patentee, Samuel Darling, by the Mount Washington Glass Co., of New Bedford, Mass., who are now making them in several styles, both in cut and pressed glass. A thumb-screw in a corner of the stand raises or lowers, by an ingenious device, the ink in a clear glass tube in the center, in which there is a funnel-shaped opening of the pen. The nature of the device may be seen by reference to the accompanying cuts, especially the one giving the sectional view. *A* is the glass stand; *B* the clear glass dipping cup; *I* the pen opening; *C* the rubber bag containing the ink; *D* the lever which, when moved up or down by the screw of the regulator, compresses or extends the rubber bag, thus forcing the ink into the dipping cup, or allowing the bag to be filled to its utmost capacity; *G* is the thumb-screw for the manipulation of the regulator. The action of the ink upon the rubber bag does not injure, but preserves it. Nickel-plating prevents the metallic parts from rusting. Each stand is provided with a rubber stopper.



BLACK CUT-GLASS INKSTAND.



SECTIONAL VIEW, ILLUSTRATING PRINCIPLE AND MECHANISM.

#### A Rubber Aid to Hearing.

A RECENT invention for those who are partially deaf comes in the line of rubber work. It consists of a soft rubber disk fixed upon a rubber spring which is inserted in the ear and so shaped that it will focus the waves of sound upon the drum of



the ear. It is made of a piece of Pará rubber carefully molded and is an article of great scientific merit. It has been used with a great deal of success and by it many of the partially deaf persons are able to hear quite well, and not only that, but can dispense with the cumbersome and unsightly ear-trumpets.

#### Ladies' Inverness Mackintosh.

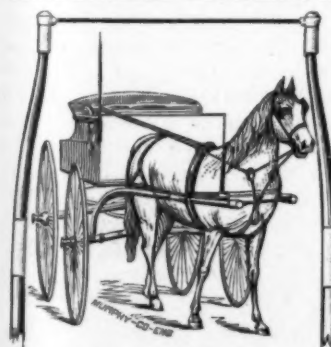
A GARMENT for either summer or winter wear that is exceedingly popular for ladies wear is that shown in the illustration. It is made of single or double texture cloth, and single or double breasted as the wearer may desire. It is sleeveless with extra-large arm-holes, which gives the garment thorough ventilation and makes it more comfortable than the Newmarket. It may be worn over any style of coat or wrap. The cape is lined and is long enough to cover the hands, and may be buttoned in front if so desired. It is a close-fitting garment, has a double box pleat in the back; the seams are sewed, cemented and stripped and cannot come apart. About 100 styles of cloth are shown from which the garment may be made. It is steam vulcanized and warranted not to crack or harden in any climate. Retailers from \$8 to \$20 each, manufactured by the American Rubber Co., Boston, Mass.



INVERNESS MACKINTOSH.

#### A Convenience to Horse and Driver.

THOSE who are accustomed to driving, particularly in the summer time, when the horse is nervous or troubled by flies, have doubtless been bothered by the reins catching under the ends of the shafts. An invention which effectually does away



RUBBER CAPS FOR SHAFTS.

with all this trouble is one that is shown in the accompanying illustration. It consists of two rubber caps which fit over the ends of the shafts and are firmly held there by suction. These are joined by an elastic cord made up of strands of rubber thread woven into an elastic fabric, so that it is utterly impossible for the reins to get under the ends of the shafts. Another advantage that this device has is that it caps the end of the shaft with a little ball of rubber so that if it strikes a horse or a pedestrian no harm results. There is no doubt but this will be greatly appreciated by horsemen, indeed by all who drive. The patentee of this invention is Mr. Frank E. Hall, who has an office in the Jordan Building, Boston, Mass. The goods are sent by mail, the price of an outfit being \$1.50.

#### Rival Lawn-Sprinkler.

THE lawn-sprinkler pictured in the accompanying cuts and known as the "Rival" is capable of covering with its spray over a thousand square feet of lawn. Moreover, the character of the spray can be regulated with the greatest ease. It can be made as heavy as rain or as fine as mist, as may be desired. Thus it may serve, not only a useful purpose as a sprinkler, but an ornamental purpose as a fountain. The differences of spray are effected by the adjustability of the acorn at the top. The Rival Sprinkler is adaptable to any water pressure. It will wear for years, being made of brass and having no revolving parts, and will not clog up, no matter how sandy or muddy the water may be, as it has no small openings. It is manufactured by the John H. McGowan Co., of Cincinnati, and can be used to great advantage in connection with their Pumping Outfit, for the irrigation of orange groves, orchards, vegetable gardens, etc. Attaching them to hydrants distributed through the orchard, the number that can be operated at one time is limited only by the capacity of the pump. This is a great saving of labor, as it enables one man to attend to the entire orchard. In the operation of this sprinkler it is screwed to the end of the hose; the rod is then stuck into the ground, and the acorn adjusted to suit the pressure, and it is ready for use. Another cut shown represents one form of the Rival Sprinkler designed for attaching to vertical pipes.



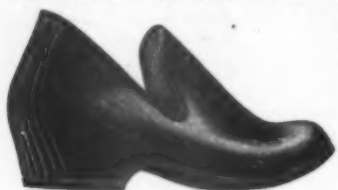
FULL SIZE, FOR ATTACHING TO HOSE.



FOR ATTACHING TO VERTICAL PIPES.

**Bailey's "Perfection" Rubber.**

THE advantages claimed for this new shoe are: (1) The heel having a ribbed back, it protects the clothing from becoming wet or soiled on the under surface by breaking the suction which two smooth surfaces create when wet; (2) the ribs being

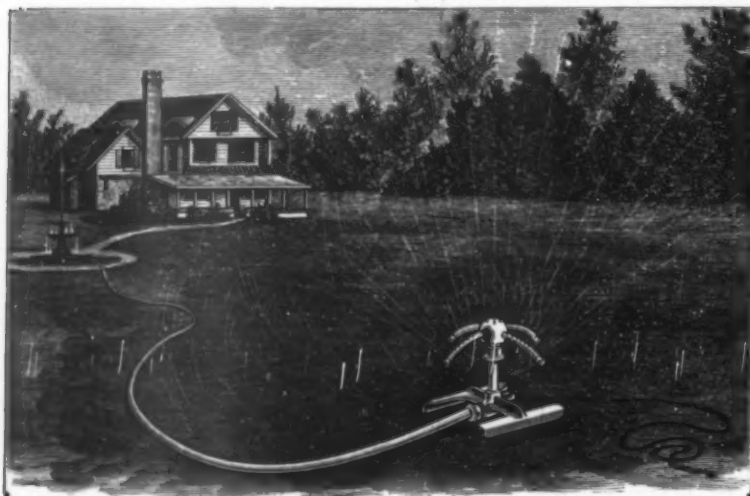


BAILEY'S PERFECTION.

near together at the top and spreading over the heel to the bottom, serves to hold the rubber securely on to the boot and prevents it from slipping at the heel; (3) it prevents the breaking of the rubber at the heel where it first gives out and a short fit cannot be forced on the wearer. It also secures the shape of the rubber until worn out. Manufactured by C. J. Bailey & Co., No. 22 Boylston, street, Boston, Mass.

**Enterprise Lawn-Sprinkler.**

ONE great advantage possessed by the Enterprise Lawn Sprinkler, made at Philadelphia by the Enterprise Manufacturing Co., of Pennsylvania, consists in a cord or rope attached to it by which it may easily be moved about the lawn even while in operation, the person in charge of it being able to keep out of reach of the water. It is a very simple apparatus, and can be put together and taken apart without the slightest difficulty. A strainer through which the water passes before it reaches the small perforations collects all dirt or sediment, leaving a perfectly free course to the water jets. Instead of the ordinary galvanizing, japanning or painting, the machine has a tin coating. The weight of the revolving parts, which generally subjects sprinklers to constant and rapid wear, is removed in this machine by the pressure of the water, which improvement



ENTERPRISE LAWN-SPRINKLER.

renders it much more durable. All parts of the machine are interchangeable and will stand rough usage.

**The Welch Inhaler.**

A THIN celluloid shell, shaped to fit over the nose, and fastened by a ribbon or rubber cord is what a casual view of the Inhaler develops. On closer inspection it will be seen to be perforated to admit the air and to contain a small drawer holding a felt pad upon which medicine is placed, the object being to apply the microbe germicides and healing balms to the diseased surfaces as long as desired. The Inhaler is generally used at night and carries on its work of healing while the

patient is sleeping. It is, however, in severe cases worn night and day and has effected remarkable cures. For colds, asthma, hay fever and kindred troubles it is said to be wonderfully



THE WELCH INHALER IN USE.

effective. Manufactured by the American Inhaler Co., Chicago; the Rubber Specialty Manufacturing Co., No. 16 Warren street, New York, Eastern Agents.

**Fraud in Para Rubber.**

JOSEPH BANIGAN, President of the Woonsocket Rubber Co., has issued a circular letter announcing the "discovery at the Woonsocket factory that fine Pará was being adulterated by the introduction of a glucose substance." The circular also states "that a farinaceous floury matter had been discovered in the mixture, and was made with such villainy that it is difficult to detect, and it has interfered with our manufactured products," soliciting manufacturers to join in a protest against this adulteration. The other manufacturers of rubber boots and shoes, on being seen, state that no such adulterated rubber has been received by them; that there has been no complaint as to the wearing quality of their boots and shoes, and that while they sympathize with Mr. Banigan in his embarrassment, having no complaint to make, they cannot join him in any protest.

The New York Commercial Co. sent a circular letter to all their customers asking whether any such had been received from them and all the replies were to the effect that none of the poor article or anything like it had been obtained by them. Importers in New York are unable to account for the source of the poor article which has created so much interest.

IN addition to the very general use of finger-cots in hospitals and by oyster-shuckers, stone-masons find them convenient, also girls in various manufactories; in fact everything in which a protection for the finger is needed and at the same time in which the glove can be discarded. Almost every day a customer comes into the stores with a new use for these convenient articles.

## TRADE AND PERSONAL NOTES.

**M**R. J. T. ROBINSON, who was the moving spirit in the formation of the Monarch Rubber Co., of Brockton, Mass., is pushing his new plant rapidly. The main building is already up. The grinders and crusher built by the National Iron Works of New Brunswick are in place, the boiler is set and by July 1 the mill will be running. The engine and boiler are from the Watertown (N. Y.) Engine Co. The Monarch Co. will make proofings, and devote especial attention to specialties in the line of mechanical rubber goods.

—A recent welcome visitor to the offices of THE INDIA RUBBER WORLD was Mr. Walter S. Perdriau of the rubber-importing firm of Perdriau & Co., Sydney, New South Wales. The firm represent some important American manufacturers of rubber on the other side of the globe, and Mr. Perdriau is here with a view to consulting them with regard to the wants of the trade in his own country.

—Richard P. Marvin, secretary of the B. F. Goodrich Co., was married in the latter part of May to Miss Jennie Miller of Akron, Ohio, the daughter of a wealthy manufacturer.

—The Imperial Rubber Co. have taken handsome quarters at No. 134 Liberty street, in the Electrical Exchange Building, New York. The company are located on the street floor with entrance from the pavement, and the store is well lighted so that the excellent quality of goods that the company now carry will be better appreciated before the purchase is made. The company are doing an excellent business, and is a good illustration of the results of "hustling."

—The rubber business of the late E. H. Clapp, will hereafter be carried on by a corporation, styled The E. H. Clapp Rubber Co. A charter has already been applied for. The business will be continued practically the same as formerly, as the corporation is to be a close one, the heirs of Mr. Clapp, comprising three children, a widow and two brothers, being the only interested ones. The management of the new company will be in the hands of the late Mr. Clapp's two brothers; George A. Clapp and Arthur W. Clapp will be president and treasurer respectively of the new company. Both brothers of Mr. Clapp have been concerned in the management of the business from its beginning. The company will do as heretofore a general rubber-grinding business, and all of the specialties made in the past by Mr. Clapp will be kept up. The headquarters of the company remain at the Boston Office, No. 620 Atlantic Avenue.

—That was a festive party from Reade street, New York, last week who sailed in a yacht from Babylon, L. I., for a week's fishing off Fire Island. It was composed of "Trust" and "Anti-Trust" people, and numbered in it G. A. Elbridge and G. S. Miller, of the Wales-Goodyear and M. S. Shaeffer of the Woonsocket Rubber Co. They only wished when they started that times could be called "dull" so that they could lengthen their stay.

—W. S. Ballou, of the Woonsocket Rubber Co., spends the greater part of the time in devising plans to protect people from the wet. This is very laudable, but once every year he extends his energies in another direction. He goes every spring to the Restigouche river, the home of the best salmon in the world, and pulls a good many of them out of the wet. After a sojourn of a few weeks of Mr. Ballou in that locality, the piscatorial community are ready, what is left of them, to bid him godspeed back to the home of the festive clam on Narragansett Bay and the horn point of Blackstone river.

—Col. Samuel P. Colt, of the National India-Rubber Co., was

one of the prominent delegates from Rhode Island to the late Republican convention at Minneapolis, and, it is safe to say, one of the enthusiastic ones.

—Mr. C. M. Clapp, proprietor of the Ætna Rubber Works, Boston, finds his health much improved, so much so that he is doing ten hours' work a day at his home.

—F. Phelan, of the F. J. Kaldenberg Co., New York, has been on a trip to Boston, obtaining orders enough to add one more to his list of successful trips.

—The Gutta Percha and Rubber Manufacturing Co. have just put into their works a Watts-Campbell Co.'s Corliss engine of 400 horse-power. The company use four steam-engines at their works in Brooklyn, aggregating over 800 horse-power. The Farrell Foundry and Machine Co., of Ansonia, Conn., will shortly deliver to this company a large hydraulic belt-press, which will weigh, when finished, over 100 tons. The press consists of two heavy platens 6 feet 2 inches wide by 26 feet 6 inches long; the lower platens resting and operated by 24 chilled-iron rams 9 inches in diameter, gradually ground in a pool-grinder, and the platens are ground true and highly polished with an emery-wheel. At each end of the lower platens is to be attached an apparatus for stretching a belt, invented by John Murphy, superintendent of the Gutta Percha and Rubber Manufacturing Co. This hydraulic press is the largest and heaviest ever built, and as an evidence of the progress made in manufacturing such a machine, it is asserted that such a press could not have been built ten years ago.

—Two men wrestling in the grinding room at the Reading Rubber Works recently fell between two mixers. One got his foot into the gearing and as a result he will go on one leg through life.

—C. J. Bailey, of Boston, is a specialist in popular rubber novelties. Of the many that he has perfected and placed on the market none have equalled the delicate rubber complexion-brush, the sales of which are increasing daily.

—Mr. E. D. Holt, who is proprietor of the popular Goodyear Rubber Store on West Fourteenth street, New York, is having a fine trade in high-grade mackintoshes which he makes up to order.

—Mr. Truslow, manager of the Acme Rubber Works, of New York, has been spending a few days in New England among his customers.

—Breck Brothers, Springfield, Mass., are doing a snug business. They keep a full line of goods, and have had a fine trade in hose this year. Their retail clothing trade has also been very good.

—The F. J. Kaldenberg Co. are doing a large business in jar-rings and a general line of molded and mechanical goods. They have two salesmen on the road, one of whom, E. S. Ross, has just returned from a successful trip through New York State and Pennsylvania. The company are selling a good many car-springs to street railway lines, making a good article, the cheapest being seventy cents. The gaskets and other goods sold by this company have the approval of many fire commissioners and inspectors.

—H. F. Knowles, of the Globe Rubber Co., reports that he is doing a very good business. Mr. Knowles is a great favorite with traveling men.

—D. M. Baldwin, of Hartford, Conn., has moved into his new store at No. 331 Main street. He has a full line of rubber goods, both mechanical and clothing. Mr. Baldwin does a retail busi-



ness and being an excellent talker, and of a genial nature, is meeting with much success.

—Mr. B. F. Pennington, general manager for the Standard Co., of Brockton, Mass., has just returned from a very successful business trip through the South and West, visiting some of the large jobbers in the rubber-clothing line. The company report that business in general with them is very brisk and that they are running on full time and putting on extra hands, having orders enough on hand now for all they can do for the next six weeks or two months at least, and still coming in every day. They expect about that time to have their fall trade commence in good earnest. Their new line, which is very attractive and contains some of the latest things in the market, has the appearance of being a "winner," as all of their salesmen are doing well with it. Mr. Pennington thinks the prospect for a good fall business is better than it has been for some time back for the rubber-clothing people.

—The prospectus of the Southern Rubber Manufacturing Co., of Chattanooga, Tenn., incorporated under the laws of New Jersey, is an attractive-looking pamphlet, filled with much information concerning the advantages of Chattanooga as a manufacturing point, in addition to the plans of the new company. The officers are: Frank Bell, president, Jersey City, N. J.; Herbert Bushnell, treasurer, Chattanooga, Tenn.; Charles Tipton, secretary, Chattanooga; and William H. Sanford, business manager, Jersey City. The directory includes, beside, William E. Coleman. The object of this pamphlet is to promote the sale of stock in the new company. It is stated that the purpose of the company is to manufacture rubber hose, belting and packing, and rubber specialties under contract for inventors and patentees. Arguments in behalf of the establishment of a rubber mill in the South are (1) the growing demand in that section for rubber goods; (2) the comparative cheapness of labor there; (3) the saving of time to buyers who now send to the East for supplies; and (4) the saving in transportation charges. The natural inclination of buyers to support home industries is also urged, and the success of rubber factories in Ohio and Illinois, due to reasons similar to those here outlined, is referred to as affording encouragement. The authorized capital stock of the company is \$400,000, of which \$250,000 is preferred stock, to be entitled to a 6-per-cent. dividend before anything is due to holders of common stock. Buildings to cost \$20,000 are being erected and the machinery needed to begin with will cost, it is estimated, \$40,000, these facilities being expected to be sufficient for the manufacture of \$400,000 worth of goods, or more, per year.

—The rubber plant at Setauket, L. I., was sold by the sheriff on May 28 to Henry B. Anderson for \$1900 and the real estate connected with it for \$26,500.

—The new factory of the Monarch Rubber Co., at Brockton (Campello), Mass., is described as 35 x 75 feet in size and two stories high. The grinders, doublers, presses for the molds and other machinery are arriving and being put into place.

—The Plymouth Hose factory at Wilkesbarre, Pa., says the *Newsdealer* of that town, "is doing a large business and becoming one of the most prominent industries in the State. The factory employs over 300 hands who are now obliged to work overtime in order to supply the demand throughout the country. It is the intention of Mr. West to build a large addition to his factory in the near future."

—The "Stitched Canvas Belt" manufactured by the Stephen Ballard Rubber Co., of New York, is appropriately described in a neat little catalogue which wears a cover ingeniously designed in imitation of the goods referred to.

—It seems that the United States Rubber Co., recently in-

corporated under the laws of New Jersey is not the first concern in the country to use the name. THE INDIA RUBBER WORLD has a letter on the subject from the United States Rubber Co. per R. L. Cornelius, manager, Western office, No. 159 Walnut street, Cincinnati. It states that a large business is being done by this company in their special order system, making up mackintosh cloths on orders by sample. They have been in business at the Cincinnati office for a year and have salesmen "on the road" in Ohio, Indiana and Kentucky.

—The Metropolitan Air-Goods Co., of Boston, send us a small pamphlet of testimonials and price-list of the air mattresses and other specialties made by them.

—The capacity of the Cleveland Rubber Co. plant at Cleveland, Ohio, on belting alone, is from sixty to eighty rolls a day.

—Foreign orders for ruberoid, which is manufactured by the Standard Paint Co., of New York, are increasing in volume all the time, while the American trade is gradually growing larger.

—Mr. E. H. Alcott, who is connected with The Francis Reddaway Co., has opened an office more in the business center than the New York office of the firm, and will be found hereafter at No. 12 Barclay street, New York.

—Mr. Walter J. Staples, of the American Steam-Packing Co., of Boston, is in the West on a brief business trip.

—Rubber- and general-supply stores are beginning to hear from J. A. Tucker & Co., of Boston, for the season's orders on duck and leather coats.

—Mr. Arthur W. Cramm has been made sales manager of the Aetna Rubber Co. at the Boston office, and R. L. Johnson, late of the Pará Rubber-Shoe Co., takes a place on the books.

—Mr. A. N. Stickney, of the Wellman Sole-Cutting Machine Co., is just back from Canada, where he has been placing some sole-cutters in the works of the Canadian Rubber-Shoe Co.

—M. Harry Hall, son of the founder of the Hall Rubber Co., has been for the past few months the agent of the Sunshine Publishing Co. of Philadelphia, his territory being New England and his office in the Jordan Building, Boston.

—Mr. C. A. Clark, formerly manager of the B. F. Hale Co., of Malden, Mass., has gone into the manufacture of insulated wire, with an office at No. 146 Franklin street, Boston.

—If one wants to see a variety of hose-pipes, and sprinklers of all sizes, shapes and conditions, it would be well for them to look up that department in the Patent-Office at Washington, where hundreds of models are kept.

—Mr. Frank E. Hall, whose patent buttons are used by the rubber-clothing trade so largely, is enthusiastic over a new rubber invention that he has, which is described this month in the department of "New Goods in the Market."

—Mr. T. V. R. Brown, formerly manager of the Granby Rubber Co. of Granby, Que., is in the drug business with his brother in New York State.

—Steam-users all over the country of late have been receiving a tiny envelope containing two or three fire-crackers. An examination, however, proved there was no powder in them, for if one pulled the string that represented the fuse a little circular came out, containing a few words in praise of the goods of the Mason Regulator Co., of Boston.

—The Crescent Insulated Wire Co., of Trenton, N. J., recently had a fire which burned part of the upper stories of their insulated-wire plant and destroyed the roof. The prompt action of the Trenton fire-department, however, saved the building. The plant was well insured.

—The Boston Belting Co. are always on the lookout to have not only the most improved machinery, but the best devices for their workmen and their work. An apparatus recently added to their plant, which should commend itself to manufacturers

of mechanical goods, is a plan for not only removing the hot air from vulcanizing rooms but introducing in its place cool air. They have placed a Sturtevant blower in such a position that it shall take the cool air from beneath a fall of water in "Stony Brook" which runs through their property, and force it into their vulcanizing room, thereby gradually lowering the temperature. When one remembers that workmen through the summer are obliged to be in the midst of heat that runs from 110° to 120°, it will be seen at once that not only is this a measure of kindness to the men, but it makes them much more efficient in their daily duties.

—The Rubber-Step Manufacturing Co. lately of Boston and now of Exeter, N. H., have issued from their new location a handsome "Illustrated Catalogue and Price-List of Rubber-Covered Carriage-Steps" manufactured by the firm. They make also rubber plates for car-steps, shaft strips, etc. An introductory account of the advantages of the use of rubber for carriage-steps is followed by illustrations of the various styles, with proper descriptive matter and prices. It is stated that these goods are finding a sale throughout this country and in England, France and Germany, as well.

—The E. Read Goodridge Co. of Newport, R. I., since the termination of their strike, have caught up with their orders, and are now building additions to their mill. The company are making suspenders complete by machinery, every part being wrought in that way, and are making a success of that branch of their business.

—E. A. St. John, of the Pacific Rubber Co., reports a good demand from the West for medium weight mackintoshes.

—A walk through the clothing districts of New York discloses the fact that all the houses are busy and really doing a good trade. Buyers are coming into the city. Two buyers from widely-separated points in the Far West happened in one store within an hour of each other and kept two or three salesmen busy for the rest of the day. The weather has been favorable for a good business, more rain having fallen everywhere this year than last.

—The Metropolitan Rubber Co. of New York, whose store and stock of clothing were partially destroyed by fire several weeks ago have refitted and refurnished their warerooms, which are at No. 676 Broadway, and resumed the occupancy of them. The action of the insurance companies in taking all the stock that was damaged, and disposing of it at auction, has allowed the company to enter its newly-furnished quarters with entirely new goods. The furnishing of the store is mostly new, and everything is in as good shape as could be desired. The company have in the meantime occupied temporary quarters on Bond street, which were fairly commodious, and which allowed the business to be pursued without interruption. At the auction sale of clothing very good prices were obtained, showing a healthy condition of the trade.

—Charles H. Dale, of the Peerless Co., is attending the Railway Master-Mechanics Association at Saratoga. When Mr. Dale meets the railroad men, he lives his earlier life over again, at the same time never forgetting to "Eclipse" all others of his present vocation in painting "Rainbows" about the goods he has to sell.

—The Peerless Rubber Co. have lately built an extension to their works at New Durham, 190x50 feet putting in a new 300 horse-power boiler, two grinders and a calender. The company are making large sales of their Rainbow packing and Eclipse gasket, and have been doing so for a long time.

—It is reported that L. Blass, of Girardville, Pa., and others are trying to form a stock company for the manufacture of a rubber boot under a recent patent.

—The gutta-percha trade is getting into a peculiar state. The article is so scarce that all sorts of substitutes are brought into the market, the compounds of which it is very difficult to state, except that many of them consist of about 90 per cent. adulteration to 10 per cent. of gutta-percha. A leading importer says he does not now handle 1500 pounds per month.

—The Mineralized Rubber Co., New York, are having much success in the use of their fluted rubber belting, and it is adapted for a variety of purposes, one after another being suggested. It will not slip, as the surface is composed of small corrugations, which have so much friction in their regular unevenness as to absolutely prevent the trouble common to smooth leather and rubber.

—It is related that a salesman of an agency of the Woonsocket Rubber Co. reached a backwoods settlement one day not long ago, and found an old Dutchman as proprietor of the general store in the place. The salesman talked for a long time into the stolid countenance of the storekeeper, and at the end of the oration was somewhat amused and perhaps disgusted, at the simple and only reply: "I know nodings about dot *wollen-sock* company."

—A Western retailer of rubber shoes has the following placard hung up in his store:

"The meenest man in the United States keeps visitin this store. He steels the buckles offen arctic, and the strings outer tennis-shoes. He would hook the linin outer rubber boots if it wasn't fastened in. His grave is dug."

—G. W. Sanders of St. Louis, was in New York early in the East to replenish his stock of rubber clothing.

—The New York Belting and Packing Co. report a very large business in every line, and in earnest of what they say, have just declared a dividend at the rate of 8 per cent. per annum on the preferred, and 10 per cent. on the common stock. The bicycle-tire business of the company is particularly good, if any distinction at all is to be made in mentioning particular lines. The sales of the company are on a basis, judging from the returns of March and April, of nearly \$3,000,000 per annum.

—The Boston Belting Co. have declared a dividend of 5 per cent. payable to the stockholders of record, May 28. This dividend is for six months. The dividend six months ago was 6 per cent., and although there is a reduction noted at this time, still in these days when money begs for 2 and 3 per cent. per annum and competition is so severe, the return is an excellent one, and is most graciously received by those interested. The factory has been running night and day for three months, in order to keep pace with a demand that comes to it from every quarter of the globe.

—Bayaud and Stevens, No. 62 New street, New York, report a gratifying increase of buyers among the rubber-men for their Floured Asbestos Fiber, which is proving its many good qualities in the compounds used by manufacturers. The article was originally intended for the use of paper-mills, and in this branch the firm won their first successes. The firm have built a new mill in addition to the former plant, and have a capacity of eighty tons per day, making heavy contracts for car-load lots, and often as much as 300 tons to a single person. At present the mill is running night and day endeavoring to fill back orders.

—The B. F. Goodrich Co., Akron, Ohio, are placing upon the market a stomach-pump which is said to be a novelty in the use of a flexible rubber tube which enters the stomach and with which is combined the bulb principle. The device is simple and is efficacious to an eminent degree, and the manufacturers, through the Columbia Rubber-Works Co., New York, are selling them in large quantities.

## PROGRESS OF THE RUBBER COMBINATION.

At a meeting of the directors of the United States Rubber Co. held in New York on June 2, two additions were made—James B. Ford, president, and J. Howard Ford, treasurer of the Meyer Rubber Co. of New Brunswick. It was reported that a committee was appointed to negotiate an arrangement with the National India Rubber Co. of Bristol, R. I. In place of T. Jefferson Coolidge, who was named as one of the appraisers for valuing the plant and stock of the different concerns, but who was subsequently appointed United States Minister to France, Charles H. Dalton, a prominent merchant of Boston, has been selected to act. The other two appraisers chosen are Charles S. Smith, President of Chamber of Commerce, New York, and Henry W. Cannon, President of the Chase National Bank, New York.

The New Haven newspapers mention a meeting between George A. Lewis, President and Treasurer of the Goodyear Metallic-Rubber Shoe Co., and also a director in the United States Rubber Co., with the stockholders of the former concern, with a view to explaining to them the proposed conversion of their stock to stock in the United States Rubber Co. "The conversion of the stock is not a matter for corporate action but rather for that of the individual stockholder, and he is given the option of turning his stock in the United States Rubber Co., or having it remain as it has."

The New Brunswick newspapers mention the presence in that town of the three appraisers named above, for the purpose of deciding upon the value of the property of the New Jersey Rubber-Shoe Co. and the Meyer Rubber Co. They were accompanied by three experts for appraising real-estate, machinery and manufacturing appliances.

The appraisers have been steadily at work, and when one learns the nature of their work, the apparent delay does not seem unreasonable. They go to a factory and take stock—the dread of the proprietor of even a small concern. Real estate men are called in to judge of the value of a building or a piece of land, and everything has to be subjected to expert judgment. In order that the prices paid for properties or stock shall be satisfactory to all the holders, whom it must be remembered represent rival concerns, everything must be done in such a way as to avoid criticism. It is not one man who is to be satisfied but a score. The appraisers at last account were at the American Rubber Co. with a mammoth job on their hands.

From the nature of the rubber business, and that contracts have been made with jobbers covering the rest of the year, the opinion is that the companies will be treated separately so far as its relations with the outside public is concerned for several months to come. The inventories of the ten companies and the final adjustment of payments to be made each will hardly be fully completed within three or four months. The routine followed is to find the actual value in dollars and cents of every article and piece of property in each company against the total of which stock is issued and divided among those selling. Meetings of the directors are held weekly and changes are made in the board so as to carry out slowly the original plan of having it composed of rubber men. No permanent officers have been as yet elected, and until the board is finally completed it is believed that this subject will remain open.

The board of directors at last accounts consisted of the following:

William L. Trenholm, president of the American Surety Co., New York.

Henry L. Hotchkiss, president of the L. Candee Co., New Haven, Conn.

Charles L. Johnson, treasurer of the same.

George A. Lewis, president of the Goodyear Metallic Rubber-Shoe Co., Naugatuck, Conn.

A. D. Lewis, director in the same.

Robert D. Evans, president of the American Rubber Co., Boston, Mass.

M. C. Martin, president of the New Jersey Rubber-Shoe Co.

James Deshler, treasurer of the same.

James B. Ford, president of the Meyer Rubber Co., New Brunswick, N. J.

J. Howard Ford, treasurer of the same.

J. Edward Simmons, president of the Fourth National Bank, New York.

John D. Townsend, president of the Knickerbocker Trust Co., New York.

John I. Waterbury, vice-president of the Manhattan Trust Co., New York.

Robert M. Galloway, president of the Merchants' National Bank, New York.

Charles E. Thayer, capitalist, Boston, Mass.

Thomas S. Patterson, of Sawyer, Manning & Co., Boston, Mass.

Henry Steers, president of the Eleventh Ward National Bank, New York.

By the articles of incorporation it is provided that the United States Rubber Co. shall have the right to issue a capital stock to the amount of \$50,000,000, of which one-half shall be 8 per cent. non-cumulative preferred stock, and one-half general or common stock. An issue of \$12,000,000 has been provided for, it is stated.

All of the property of the United States Rubber Co. is free and clear of mortgage, and no debentures of any kind will be issued, it having been provided in a by-law which is printed and made a part of the stock certificates, "that no bonded or mortgage debt shall be created by the company upon this property without the consent, in writing, and first obtained of the holders of at least three-quarters of all general stock and as well of at least three-quarters of all preferred stock of the company outstanding at the time, and this section of this by-law shall not be abrogated, revoked, repealed, altered, modified or amended, save with the like consent which in each such case shall set forth in full the change proposed to be made hereinafter."

YOU cannot boom rubber boots in dry weather (either winter or summer) by offering your \$2.50 line for \$1.85, as many dealers can vouch for who have been overstocked with these goods. It's a good deal like offering straw hats in midwinter—they don't go. The best way to sell rubber goods is to work them at a profit of from 15 to 20 per cent. and to stick to one price.—*Boots and Shoes Weekly.*

TALC is imported from France and Italy, although there are now considerable quantities brought from North Carolina, where mines are being worked. Rubber-men use large quantities of it, quotations being made in ton lots. It is a form of magnesium, being a white slippery stone and very soapy, a good deal of it being used in the manufacture of soaps. The domestic article has not obtained high favor, and the foreign is used almost exclusively. Quotations range from \$12 to \$27.50 per ton.



## REVIEW OF THE RUBBER MARKET.

THE apathetic condition of the market, which was the feature in May, has been reversed, and affairs have taken on a state of activity very gratifying to the broker and importer. During May there was a feeling of uncertainty, both as to the demand for manufactured goods in the future, but also as to the full scope of the intended operations of the United States Rubber Co. The season of wet weather, with the light stock of goods held throughout the country, has given the buyer confidence, and a better idea of the plans of the United States Rubber Co. has persuaded those whose stocks had become low to replenish at once. It was natural to desire as small amount of rubber as possible should pass under the appraisers hands, and this will be a factor yet for some time, but replenishment must come some day, and now the renewed buying is meeting a strong statistical position, with a future in this respect uncertain, and which may yet command much higher prices. At any rate, the leading brokers are "bulls" on the situation, and the large sales that are now being made—200 tons within three days last week—are inspiring to them.

The phenomenal times through which we are passing favors low prices in everything, and in rubber the present price is one of decided firmness rather than a response to the situation in the way of an advance in quotations. The price, however, on the three days' business jumped the quotation for Islands from 67 to 69 cents. Centrals, notwithstanding increased arrivals, are scarce, and Africans can be placed in the same category. There has been little doing in Balata lately, and gutta-percha is so scarce that there are more substitutes for it in the market than ever before. Everywhere the native gatherer seems to be loafing while his civilized brother is taxing the mind to augment comfortable wants in the rubber line.

The receipts at New York during the past month are as follows:

	Pará.	Caucho.
May 23—By the <i>Basil</i> .....	588,000 pounds.	30,000 pounds.
May 26—By the <i>Clement</i> .....	150,000 pounds.	300 pounds.
May 31—By the <i>Finance</i> .....	269,000 pounds.	18,000 pounds.
Total.....	1,007,000 pounds.	482,00 pounds.

Afloat is the *Origen*, which left Pará on June 4, with 50 tons.

The receipts of Centrals in May, at New York were 337,000 pounds against 174,000 pounds in April.

The world's stock of Pará rubber on June 1, compared with April 1, is estimated as follows:

	May 1, 1892.	June 1, 1892.
United States.....	712 tons.	615 tons.
England.....	1235 tons.	1050 tons.
Pará.....	680 tons.	210 tons.
Afloat to United States.....	247 tons.	303 tons.
Afloat to England.....	50 tons.	25 tons.
Total.....	2933 tons.	2203 tons.

In Pará there were 10 tons in first hands; 130 tons in second hands; and in transit on the river 70 tons. Stocks in Pará seem to be decreasing rapidly.

One year ago there were in the visible supply 4600 tons, three-fourths of which were in the United States and Liverpool. Deliveries during last month were 1080 tons against 854 in May, 1891. Of this the United States consumed 720 tons last month against 649 in May, 1891, of this the United States consumed 720 tons last month against 649 tons in May, 1891, and England consumed 360 tons against 205 in the same time last year.

The noteworthy feature in these statistics is the small stocks,

when compared with last year. In seeking for a reason for this rubber importers are decidedly of the opinion that consumption is steadily growing, and more and more outstripping production with the present incentive to the gatherer.

Receipts at Pará during May were 519 tons against 1060 tons in May, 1891. The estimated receipts for June are 590 tons against actual receipts in June, 1891, of 700 tons.

The receipts for the past four months at Pará compared with the corresponding months in 1891 are as follows:

	1891.	1892.
February.....	2310 tons.	1670 tons.
March.....	1540 tons.	1430 tons.
April.....	1060 tons.	1005 tons.
May.....	640 tons.	590* tons.

\*Estimated.

It will be seen that Pará to some extent is getting less rubber than a year ago, by about 850 tons, but the visible supply of the world has decreased nearly that amount in a single month. In April the receipts at Pará were 50 tons less than in April of 1891, while the stocks were depleted to the extent of 2397 tons. Naturally matters somehow even themselves up, but apparent a few weeks more would suffice to make an absolute scarcity of Pará rubber, and substantial aid from the Amazon could not be had much before September, or later. The demand from manufacturers, in the present conditions of affairs must continue to be a large one, providing their stocks be normal, a fact however from the nature of affairs difficult to ascertain. Aptly put the visible is a very strong feature, but it is generally the invisible that beats the speculator.

The statistical position of Pará rubber in New York is thus reported for May, 1892, as compared with the same month in preceding years:

Stock of Pará here	April 30, 1892,	about	1,600,000 pounds.
Receipts	May	"	1,415,000 pounds.
Deliveries	May	"	1,615,000 pounds.
Stock	May 31, 1892.	"	1,400,000 pounds.
Stock	May 31, 1891.	"	3,350,000 pounds.
Stock	May 31, 1890.	"	985,000 pounds.

## Prices for May.

	1892.		1891.		1890.	
	Fine.	Coarse.	Fine.	Coarse.	Fine.	Coarse.
First.....	65	46	89	59	87	66
Highest....	68	46	90	59	92	68
Lowest....	67	45½	87	57	87	66
Last.....	68	46	87	57	91	67

[It will be noticed that on account of the attempted "corner" last year, prices were much higher at this time, although the stock was more than double what it is at present.]

The latest New York quotations are:

Pará, fine, new.....	69-70	Sierra Leone.....	25-42
Pará, fine, old.....	72-73	Benguela.....	46-47
Pará, coarse, new.....	46-50	Congo Ball.....	37-48
Pará, coarse, old.....	48-51	Small Ball.....	35-39
Caucho (Peruvian) strip.....	47-48	Flake, Lump and Ord.....	25-26
Caucho (Peruvian) ball.....	52-53	Mozambique, red ball.....	55-56
Mangabeira, sheet.....	40-42	Mozambique, white ball.....	55-56
Embera, sausage.....	51-52	Madagascar, pinky.....	40-42
Guayaquil, strip.....	40-43	Madagascar, black.....	28-43
Nicaragua, scrap.....	48-50	Borneo.....	28-43
Nicaragua, sheet.....	47-48	Gutta-percha, fine grade.....	175
Guatemala, sheet.....	41-45	Gutta-percha, medium.....	115
Thimbles.....	40-41	Gutta-percha, hard white.....	115
Tongues.....	34-38	Gutta-percha, lower sorts.....	nominal

In regard to the financial situation Messrs. Simpson & Beers, brokers in crude India-rubber and commercial paper, New York, report:

"We have still to report a superabundance of money, with

exceptionally low rates prevailing. Very choice two-name rubber paper sells at 4 to 4½ per cent; single-name paper, 5 and 5½ per cent., with only a moderate supply during May. Gold exports have been resumed, but unless prolonged, our money market will not be affected adversely."

### RUBBER-GOODS TRADE.

IN boots and shoes the current demands have been good. St Louis, the center of the flooded districts, has done a most excellent business, as almost every one who has an out-door calling has seen the necessity for high boots. This has been particularly noticeable among such people as switchmen on railways, teamsters, etc. Of course light foot-wear has been in good demand and it is expected that the impetus given to the business, which really extends through many States in this particular, will be felt for the remainder of the season. In the South, which is also afflicted, there has been little noticeable replenishment of stocks. Dealers from that section generally do not make their appearance in this market until late in the summer. In New York city the trade is as usual from hand to mouth, jobbers carrying light stocks, but mail orders have been very good. The Eastern trade is better than in New York. There was a good trade all around just before Decoration Day, which, it is noticed of late years, has become a feature of the year.

In tennis goods the demand has been excellent, and the stereotyped story is all there is to tell. The whole world is running to easy shoes, and while the craze for russets may interfere with a maximum enlargement of the tennis trade it cannot by any means displace the latter. The russet is affected by moisture, a taking quality with the tennis. Details are being made with freedom and are better than last year.

Dealers report a good business in the mechanical goods line, although there are statements from some sources that goods do not run into money in a satisfactory way. In other words, a large business in gross is being done, and a smaller profit is being made in the aggregate, but this is a feature of the times. The leading manufacturers who advanced their prices say that they are well satisfied with the result, and that they have no difficulty in making sales. It would go to show, according to them, that if ordinary qualities are made, it is hard rowing, but as soon as a high standard of goods is placed on the market, wind, current and tide favor them and prices are not disputed. During the past few years the masses have run to cheapness, and we find it in all its phases on every street and in daily advertisements. In the meanwhile there is a large and growing class of people who are tiring of cheap goods, and find it to be true economy to buy the best. A man who buys a poor belt pays as much for transportation, clerk-hire and miscellaneous expenses, and spends as much time getting it and adjusting it as he would for a good article. Whatever good material in it costs just as much with the ever ruling principle that it is only as strong in the whole as in the weakest part. Such articles are always giving out and then the time lost and the confusion which ensues are simply extravagances. The same holds good of packing, hose and everything which is to receive usage in work, and shrewd men are meeting the question practically, and others not quite so shrewd are learning a lesson in experience sometimes very costly. Some good orders have been received for packing and belting within the past month, and the export trade is excellent.

In garden-hose the demand continues, although in the West and the South the floods are causing the people to believe that nature has taken the job of watering the earth, and according to man's idea, is making a mess of it. This may have an effect on the business later on. In mats the factories are working night

and day. In bicycle business the demand is simply extraordinary, and some mammoth contracts have been made. The pneumatic with its bulk of rubber is a good thing in every way for the rubber man. There is a great deal of flexible tubing for surgical work called for, and some very nice work is being done in it. Gas-men are taking a great many tips for hose. The jar-ring business is not quite up to last year, for obvious reasons.

Those who are doing calendering work for others, are refusing orders, not caring to allow other profitable business to pass by them.

In druggists' sundries the business is fairly active for well seasoned specialties. Some good export business is being done. Dress-shields are selling well this year, better than last, which will be remembered to have been a good year. The demand for dental-rubber is very good.

Rubber clothing is reported as dull and lifeless by some houses, while others maintain that the volume of business is as large as ever, but the policy of dealers in cutting prices is so pronounced as to be disheartening. Fine mackintoshes are in good request. Western mills are reported busy, the floods and rains having made a new demand. Cloth men say that their business was never better, and in May they did more than in the corresponding month for nine years past, or 25 per cent. more than a year ago. They are especially encouraged by the fact that the better qualities take the lead. Stocks are known to be low, and shrewd merchants predict a small "boom" in the business this fall. Certainly the trade is now very healthy.

Webbing is in fairly good request with low prices. The production of American goods is rapidly increasing.

In hard-rubber specialties the trade has been better than last year, but the outcome cannot be ascertained low prices being taken for all descriptions of goods.

Dealers in air-goods say that the season is a very even one and is satisfactory.

In dress-shields the business is in larger volume than last year.

In manufacturers' requirements litharge is dull, buyers only taking their actual necessities from day to day. In oxide of zinc there are light stocks. Linseed-oil is in light demand. Spirits of turpentine is very low and much depressed. Since the culmination of the corner in sulphur, prices remain very steady at a reduction of 30 per cent. from the highest points.

---

Mr. A. RANDOLPH, manager of the Stoughton Rubber Co., sailed for Europe on the *Cythia* on May 29. He takes the trip to secure needed rest and recuperation. Quite a party of friends were at the Cunard wharf to see him off. Certain of them, securing the key to Mr. Randolph's state-room, decorated it very beautifully with cut flowers. May the voyage be pleasant and the kindly wishes of his friends all be realized.

---

Mr. C. S. KNOWLES, of Boston, well known as a rubber dealer, and of late one who has been active in the business of electrical supplies, has been elected president of the New England Electric Club. A better choice could hardly have been made, for Mr. Knowles, beside being an astute business man, is an accomplished diner-out, and will preside at a stormy business meeting or a banquet with equal grace.

---

Mr. A. H. LYMAN, of the Chicago store of the Boston Woven Hose and Rubber Co., is spending a few days in the East. Chicago evidently agrees with Mr. Lyman for he has gained twenty-four pounds and feels "out of sight," so he says, although he does not look vastly that way.

**A Gross Misstatement.**

**A** MAN by the name of C. B. Dudley, who pretends to have some reputation as a chemist, has recently made some analyses of anti-friction metals, among which is the Magnolia Metal.

There are gross errors in the analysis of Magnolia Metal, and those of other anti-friction metals are incorrect.

If these analyses are instances of his skill as a chemist it would be well for the public for him to quit the business.

Below is a statement of eminent authority on anti-friction metals bearing out the above statement.

**MAGNOLIA ANTI-FRICTION METAL CO.**

In the analysis of Magnolia Metal, Dr. Dudley has overstated one constituent part, and has omitted tin (which it always contains), and other materials. On the same page is given an analysis of Antimonial lead, which may be correct, but not an ounce of this is ever used in Magnolia Metal. Respectfully yours,

H. G. TORREY.

(U. S. Assayer in U. S. Mint service, New York.)

No 30 Wall Street, New York, May 1, 1891.

ONE of the new features in the tennis trade this year is the leather uppers which are adapted for bicycle-riding, running, etc. In these lines the rubber soles are sewed on in addition to cementing. Canvas as a rule meets every want, and in wet grass and at the sea-shore is better than leather.

A RUBBER-MAN gives the following as a compound for the soles of tennis shoes: 8 pounds fine Pará, 8 pounds coarse Pará, 7½ pounds litharge, 1 pound lampblack, 8 ounces sulphur.

THE cost of selling mackintoshes after they are out of the factory is estimated by one New York house to be from 10 to 15 per cent. Competition in them has been very severe, and some dealers ask a price so near the cost of manufacture that it is difficult to believe that they are duly informed as to the cost of vending goods.

RUBBER substitute, as it is termed, is comparatively little used in this country, the importation of a leading dealer being reported by him as not exceeding eight tons per year. It sells for seventeen cents per pound. It is made chiefly of chloride of sulphur and linseed or rapeseed oil, the latter being preferred. Various other compounds are used, but they do not give so much satisfaction on account of the great difficulty in freeing the sulphur. The Americans use ammonia for this purpose, a process attacked by old-time foreigners. The test of a good substitute is an almost indescribable feathery touch; or, if kept in a jar, the poorer sorts will rot in a short time.

TRAVELLERS in Europe, and particularly native Europeans, are very fond of a rubber boot fur-bound at the top, and with fur facings. It is a boot that is a trifle clumsy to look at, perhaps, but it is especially comfortable. The "foothold" has also gone into Europe to stay and the sales are increasing daily.

SOME foreign coin-mats are on sale in the New York stores. They are square in shape, with the teeth so near together that they do not readily catch the coin. The chief trouble with them, however, is that they are overcured with antimony—so much so as to be worthless for continuous wear. In appearance they are possibly superior to the American mat, although this is a matter of taste.

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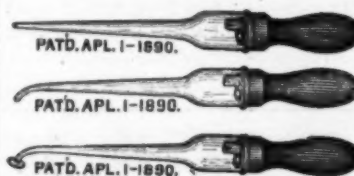
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will reach well into a deep  
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## REQUIREMENTS OF RUBBER COATS FOR MINERS.

By Albert Williams, Jr., Mining Engineer.

A SUBSCRIBER to THE INDIA RUBBER WORLD asks advice as to the best means of improving the quality of rubber coats for miners' use, and his letter has been handed to me for consideration. The inquirer, who is the foreman of a rubber-clothing company which makes large numbers of these coats, states that there is complaint that the goods are not sufficiently durable—a state of affairs as unsatisfactory to the manufacturer as to the user. He wishes to know something of the conditions to which such coats are subjected in the mines, to the end that the information may be utilized in improving the products of his company.

If our correspondent could only witness for a little while the treatment which his goods receive at the hands of the miners, he would not wonder that, as he himself says, the coats sometimes last only thirty days. Sometimes it might seem highly creditable that they should live as long as that. In the mining regions rubber coats are often worn outdoors for mere protection against rain and snow, just as in other places, but with the difference that the usage is sure even in this case to be far harder than would be accorded to sportsmen's clothes, partly because the country is generally rougher and the fabric is brought rudely into contact with rocks and brush to a greater extent than if worn by a hunter or fisherman, and partly because the miner is considerably more careless in his ways. In the Far West the extremes of cold and heat are very great, but I do not think that the goods deteriorate from this cause. They are sometimes burned, however, by being brought too near the fire when the wearer comes in from an outside Arctic temperature and hastens to thaw himself out, rubber coat and all, in the quickest way.

Rubber coats, rubber boots and rubber hip-boots are also worn outdoors in hydraulic mining, which is a peculiarly trying service, as is also open-air quarrying. Underground rubber coats are worn in wet mines of all kinds—those of gold, silver, copper, lead, iron and coal. They are used not merely as a protection against dripping water and mud, but also as a sort of complete armor to defend the wearer from falling dirt, grit and rock, and to save his skin when bumping up against jagged rocks, corners of mine-cars or rough timbers. In a few mines, like those of the Comstock lode, Nevada, and some of the quicksilver mines in California, the rubber coats have had to shed water that was positively scalding; but of course this is not common. Mine waters also contain metallic salts, chiefly sulphates, in solution, but it is questionable whether much if any chemical damage has thus resulted to the rubber. The probabilities are that so far as chemical action is concerned rubber is much the best material and protects the cotton part of the fabric from rotting better than any other finish. When climbing ladders, ascending or descending shafts, inclines or winzes in buckets, cages, skips or cars, the owner

of the coat allows himself to rub against anything and everything that comes in his way, relying on it to shield his person from scratches and bruises, and not exercising at all the same care to avoid knocks as if he were accoutered simply in the woolen shirt and ordinary trousers. As the new rubber coat for a time proves itself so efficient a general protection it is likely to be abused and overtaxed, with the result that might be expected. It is often worn, as a matter of habit, when there is no real need for it, both on the surface and below ground, and becomes a garment for all times, seasons and weathers, besides being slept on at times or made up into a pack. If it has pockets, these are used for carrying small tools like gads and stump drill ends and miners' candlesticks (which are as ingenious puncturing implements as could well be devised), and, as a matter of course, frequent loads of ore samples and specimens.

But, in spite of all, the coats seldom wear out. They don't get the chance. They tear out. And the reason is obvious. The quality of the goods sold to the miners is fine enough, as compared with other rubber clothing—perhaps in one sense finer than is necessary so far as finish is concerned. Attention seems to have been directed mainly to producing garments impermeable to moisture, of light weight and as pliable as possible so as to give free play to the movements of the arms and body—all of which points are excellent and desirable so far as consistent with the first essential—strength. What is wanted is not so much a high grade of gum or much of it as great solidity in the textile backing. A fine light rubber coat, approaching the gossamer style, which would be entirely suitable for city use and under ordinary conditions of service, would be altogether out of place in the mines, and although the coats actually sold and used for this purpose are made with some regard for the conditions, still they are not quite what is demanded. Of course neatness, lightness and sightliness are well enough in their way and would be fully appreciated by the miners so long as the main requisite of durability is not infringed upon.

A great deal of oiled-canvas clothing is used in the mines. It is unsightly, heavy, stiff and uncomfortable, impeding free action of the limbs, but is cheaper than rubber clothing of good quality. It is also very strong—so strong indeed that if it catches on a projecting timber in a shaft, for instance, and the wearer slips, he will actually hang from it without tearing the material. This kind of clothing is a serious competitor with rubber for mining work, and manufacturers of rubber clothing might borrow a hint from it, for it is salable on one account only—its durability under the hardest conceivable usage. If a line of rubber clothing were manufactured especially for this trade, having the same or nearly the same durability as the canvas garments, it would be generally preferred for ser-

vice in wet mines, even at a considerably higher price. In brief, my advice to the correspondent quoted is to design a coat especially for mine-use and put it on the market as such. The cotton fabric on which it is built should be heavy and comparable with the stuff used in making oiled-canvas coats. A single thickness of stout coarse material probably would answer as well as a manifold ply of finer goods. The textile part should be relied on for strength, not the gum; and the latter can be economized so that the cost of manufacture and the selling-price may be kept down. A coat for mine use should not be so long in the skirts as to be an encumbrance at work. If pockets are added, as is desirable, they should be canvas-lined and

secured with copper rivets, as they are likely to be severely strained in carrying small tools, pieces of rock, etc. The writer happened to become the possessor of one of the first iron-framed zinc trunks made, and had much satisfaction in watching the discomfiture of the professional baggage-smashers who encountered it. Now a rubber coat for the mines ought to be constructed on a similar principle; it should be able to take care of itself without any special precaution on the part of its owner. It should wear out fairly, and not come to grief prematurely because of rents and holes. Having thus outlined the requirements, there is no doubt that our correspondent's ingenuity will evolve the article wanted.

## IMPURITIES IN STEAM IN RUBBER-CURING.

*By Robert Grimshaw, Mechanical Engineer.*

THERE seems to be some mysterious trouble with spoiling India-rubber goods that are put into the steam-chamber to be vulcanized; they vary in quality although the "mix" is the same and the conditions seem to be the same as regards time of exposure to the influence of the steam, and pressure of the steam. The question has been asked if there may not be some unfavorable action on the goods, by reason of substances carried over from the boiler with the steam, which would act on the rubber itself or on some of the substances which are combined with it; so that while the conditions may apparently be the same, they would in fact be different by reason of the articles being cured not in pure steam but in a mixture of steam or some vapor or other. The question is worth looking into; and the best way to look into it is to consider every possible way in which the goods might be spoiled, and for each one of those who are troubled by this state of affairs (and the complaint seems to be widespread) to determine whether or not any of them applies.

Of course all understand that every separate mix really requires a different time of exposure, or different steam temperature, or both; and that to expect articles of widely different composition to come out all perfect, when vulcanized together, is expecting rather too much. Still, it does not seem unreasonable that if a batch of a certain kind of goods—say rubber hose—is a success one Tuesday, another batch just like it as far as is possible to make it, in composition and method of manufacture, should under the very same set of conditions as far as they can be reproduced, come out on the next Tuesday just like the batch that went in on the first occasion. Likes should produce likes, and when like is expected and does not appear it is reasonably certain that likes have not been started with.

One of the marked peculiarities of water is that while it will hold various substances in solution while it is in its ordinary or liquid state, it is very apt to drop them when freezing slowly, and very much more apt to drop them when evaporated rapidly. Thus we find clear eatable ice forming on muddy and in some cases foul streams, where

it has been frozen slowly; the ice refusing to hold in solution what the water was able to keep with it. Similarly the saltiest sea-water from over the side, or the foulest bilge from the hold, may be distilled into very pure although very tasteless drinking water; and in fact the very fact of the distilled water from such a source being tasteless is one of the common-sense proofs that it is more pure than that from which it was distilled. Now distilled water is nothing but condensed steam—going to show that under ordinary circumstances steam is pure and contains nothing but pure water.

If, however, we freeze water very rapidly, we find that it will retain mechanical impurities which may have been in it; and still more rapid freezing will often leave it with substances remaining therein, which were only in chemical solution in the liquid water and would have been dropped out if the freezing had been very slowly conducted, without agitation. In the same way with evaporation; we find that if it is carried on very rapidly, there is a tendency to carry over with the steam, mechanically entangled, a certain amount of liquid water which has not been evaporated (this being entirely distinct from steam which has been recondensed while in the pipes or passages).

Of course if there are in the water substances which boil or evaporate at a lower point than the water does (212° in the open air or not under pressure, and higher points where there is pressure tending to restrain the disengagement of the vapor) they will be liable to be carried over with the steam as vapor mixed therewith. This would be the case with naphtha mixed with the water, only it would tend to come over first, before the water did.

Now to explain the variation in quality of rubber goods apparently of the same mix, and exposed in the vulcanizer to the same pressure and for the same length of time we may have the possibility (1) of pure water being mechanically carried over with the steam from the boiler into the vulcanizer and there acting on the material simply as pure water; (2) of impure water being carried over the same way and exerting on the material an additional undesirable influence by reason of the impurities which it contained;



(3) of either of these two sets of conditions being reversed, and the goods being subjected to the action of pure dry steam, when it really should have had steam wet either with pure entrained water, or with impure entrained water. We all know that brewers say that pure water does not always make the best beer—Bass's ale is a proof of this—and distillers say about the same thing of the water required for whisky-making. It may be the same way in rubber manufacture; pure dry steam could for some classes of goods be undesirable.

There yet remains another thing which might account for the variations in quality—and that is (4) superheating of the steam. Steam which is evaporated in contact with water has a normal temperature which belongs to the pressure at which it is evaporated; and such saturated steam should be uniform. But instead of going to one extreme and containing entrained water it may be the other way and have a temperature higher than that regularly belonging with the pressure. While there are few boilers which are capable of superheating, it does happen, and is indeed liable to happen under some conditions, even with boilers that have a habit of making wet steam. For instance, there is in Philadelphia a boiler that is notorious for making wet steam, and which has once or twice knocked out the cylinder-heads of the engine which it supplies; but about from 1 to 1.30 P. M. every day it has a trick of furnishing steam that will almost burn a shingle. This is because in that shop there is a very short noon-time, and the fire under that boiler not being allowed to get down, the steam gets superheated because there is no demand for it, and what is in the boiler is exposed for half an hour to the action of the fire, thereby becoming very dry. Even when the supply is called for, all the brick-work about the steam drum of the boiler (which is in connection with the main shell only by two small necks or nozzles) being very hot, the steam which is in it and is not strictly in contact with more steam-disengaging water-surface, becomes hotter than it should be for its pressure; and this state of affairs continues until the demand for steam causes an equalization

of temperatures between the brick-work and the steam-drum, after which there is no more superheating.

Now if a rubber factory has a boiler which has tricks of this kind, the goods may be spoiled, for a fourth way, by getting overhot steam, or for a fifth way, by getting steam which was only saturated, when properly there should be superheated steam. Of course these last two cases would not be likely to occur where the temperature in the vulcanizer was shown by a thermometer; but it is the more usual custom to judge it by the steam-pressure gage.

There may of course be other possible causes of variation in the quality of the goods; there is possibility (6) of the quality of the materials being better or worse than usual, or (7) of the mixture being more or less truly made, or again (8) of their closeness to each other or to the walls of the steam-chamber making a difference. But assuming that all of these causes have been looked into, and that there is nothing left to account for the variations than the presence in or absence from the steam, of foreign substances, or the difference in the matters of saturation and superheating—the first thing to be done should be to be sure whether or not the water supplied to the boiler is pure. If it is pure the next thing to be done is to see whether or not the steam supplied to the vulcanizer is just dry; neither wet nor saturated. It is very easy to determine this either with a calorimeter in trained hands (it will lie like a thief if used by a non-expert) or with a thermometer. It is also easy to change these conditions and give the vulcanizer wetter or dryer steam than it has been getting, by forcing the firing or by letting the boiler stand without any demand for steam, before supplying the vulcanizer. If the trouble cannot be remedied by giving wetter or dryer steam, then it may be desirable to use a steam trap or a separator between the boiler and the vulcanizer; or if there is already one, it may be best to throw it out of the connection for a while and try it that way.

In such a matter about the only way is to fall back on the old motto: "to find out whether a match is good, strike it."

## THE STATE OF THE RUBBER-TIRE INDUSTRY.

By I. A. Sherman.

THE use of India-rubber in the making of bicycle-tires has been one of large and rapid growth, and at present it is somewhat difficult to state its extent with any degree of accuracy. Statistics gathered today, if such a compilation were possible, would prove valueless to-morrow, the industry taking strides from month to month in such a way as to compel bicycle-manufacturers to simply "pitch in" and make as many as the capacity of their works will permit, and then philosophically rest content with the idea that they have done the best they could. All the world seems to be on wheels, and the young man or boy of even moderate means has now one ambition, and that is to own a bicycle. Having obtained it and used it for a year, his next idea is to barter it for

one that is built on better lines, the changes for the better in wheels being frequent. The great popularity of the modern bicycle is due largely to its equipment with rubber tire, pedals and handles.

Seven or eight years ago the tires, which embrace the most of the rubber in the bicycle, were *wrapped*, but manufacturers believing that molds could be used with better effect, the rubber company who up to that time had furnished the greater portion of these articles, decided to abandon the business. This was then considered wise, for the reason that, it was argued, forms would be constantly changing, and new molds would be so expensive as to materially lessen profits. The extent of the business was by no means then foreseen, but that company has had

no reason to regret its action as the rapid strides in the consumption of mechanical goods have taxed its capacity to the utmost. Then a factory at Hartford turned its attention to the rubber-tire industry, besides which the New York Belting and Packing Co. from the start had devoted attention to the business.

Importers and brokers watched the business grow with a passing interest at first, but they could not help observing the quantities of rubber bought by the company in New York, and also by the factory at Hartford. Demands were continual, and the New York company afterwards reached the point that their monthly consumption no longer increased, simply because the capacity of their tire department was strained to the utmost. The mill at Hartford also reached its limit. Then the Overman bicycle people established a mill solely for making tires, and their demands followed in the same way, brokers thinking nothing of filling single orders from that company for 50,000 pounds of rubber. Meanwhile almost every mechanical-goods company had investigated the question, and the majority of them to-day are devoting a portion of their capacity to this industry. Some of the larger concerns have not taken it up for the reason that they now have too much else to do, but it is conceded among manufacturers that any company desiring to make tires will have for some years all that it can do.

Regarding the statistics of the industry no two persons agree. The gossip among bicycle-men is that 200,000 "wheels" have been made this year so far. One concern has turned out 40,000 "wheels" within a year, and upon this basis the remainder could readily be accounted for. Importers say that 2,000,000 pounds, an estimate made some six months ago as the consumption for the current year will prove absurdly low. Others, who are incredulous when Rumor gives out statistics, on account of the natural tendency in human nature to inflate figures, think that 2,000,000 pounds will form the maximum of the requirements of this industry. The weight of a single tire is from three to six pounds, or for a bicycle, from six to twelve pounds. If the production this year should be 300,000 bicycles, the two-million mark would be readily passed. This is however for the United States alone. England has over 1100 bicycle-factories, most of which are on a small scale, but some of them most extensive. One of them is now consuming 15,000 pounds of rubber in a single week.

Little is known here of the state of the industry on the continent of Europe, but reasoning by analogy, it is believed that those countries, with their perfect roads, are not behind the English-speaking nations in the bicycle-tire industry, but most likely in advance of it. The old velocipede was once a craze in France, and that country was the cradle of the industry.

In the importance of the bicycle industry it probably takes place next in line to mechanical goods proper—boots and shoes standing first—and its rapid growth accounts to some extent for the fact that the production of goods from Pará rubber is outstripping the present output of that region. At present nothing but fine Pará is used, a very po-

tent factor in making up the balance-sheet of supply and demand. The wheel is very popular, and the manufacturers at the head of the industry are as shrewd as they are untiring in fostering the demand. They have taken the lead in molding public opinion in favor of good roads, a great desideratum for bicycle-riding. They have induced telegraph companies to mount their messengers; in some cases letter-carriers use them, and the manufacturers are impatiently awaiting the retirement of the present General commanding the Army to make an effort in that direction. In view of these untiring efforts, the question may be before many years come up in a very pointed way: Where is the rubber to come from? Even now the question is before the trade as to the effect upon prices during the present year of this comparatively new industry.

The North British Rubber Co. of Edinburgh have a bicycle tire, one of their "Clinchers," which has run 4800 miles without a crack. The company employ 1500 men in their rubber factories. Another concern in Birmingham tires 2300 pneumatic wheels per week, requiring about seven tons of rubber for that purpose in that time. Another firm in Leicester, England—W. & A. Bates—have brought out a pneumatic tire which weighs only 4 pounds and 4 ounces. It is repaired with small conical plugs of rubber, similar to the method adopted by the Pope Manufacturing Co. in this country. It has, however, a novel protection against puncture in the first place, which consists of the rims being fitted with a protecting canvas and rim band.

The French are little heard from in the pneumatic-tire business but one lately invented by a man named Boverly is receiving no end of commendation. Like the Boothroyd, it is an ordinary rubber tube, the middle inner portion of which, however, is furnished with an endless chain of thin rubber flaps cemented one behind the other on one of their edges. One flap by this system covers nearly all the surface of the other and a puncture has to make its way through three thicknesses before seriously injuring the tire, and at the same time the latter has the advantage of being practically of only one thickness. The internal pressure keep the flaps pressed down to the tire, but if it becomes necessary the tire can be deflated, water poured in, and then inflated, which will glue the flaps down securely. Such a tire, it is reported, cannot be permanently injured except by a buzz saw.

#### A Bill Concerning Air-Brakes.

THE equipping of railway freight cars with air-brakes is an important industry which has sprung up in the mechanical rubber-goods line within the past year or two. The advantage has proved to be so great that the leading railways in order to make its use uniform, so that there can be a perfect interchange of cars, have asked Congress to pass a bill requiring the use of this brake on all cars. The bill under consideration provides that every new locomotive after July, 1893, shall have power-brakes sufficient to control a train, and after July, 1895, all trains. Also, after July, 1895, all new cars shall be likewise equipped, and after July, 1898, all cars,

## THE "DRY-HEAT" VULCANIZATION OF RUBBER,

WITH SPECIAL REFERENCE TO THE USE OF AN IMPROVED VULCANIZER.

By Charles A. Fawsitt, F. R. S. E., F. C. S.\*

FOR the vulcanization or "curing" of rubber four processes are in use, namely, the steam, dry-heat, cold-cure, and vapor processes. The "steam" process is used almost exclusively for all goods termed "mechanicals;" and the goods to be cured are packed, either unprotected or wholly or partially covered, into large iron vessels into which direct steam is turned until the pressure corresponding to the temperature necessary for the proper curing of the goods is reached, and is continued for a time which varies according to quality, thickness, etc., of the goods. The "dry-heat," "cold-cure" and "vapor" processes are principally used in the curing of waterproof cloth.

The "dry-heat" consists in mixing the rubber with a small percentage of sulphur and other ingredients, and "curing" the cloth spread with such a mixture in a stove or air-chamber heated by pipes or chambers through which steam or hot air circulates.

The "cold-cure" process consists in exposing the rubber composition which has been spread on the cloth to the action of chloride of sulphur dissolved in bisulphide of carbon or other solvent.

The "vapor" process consists in exposing the goods which are to be cured to the action of the vapor of chloride of sulphur alone or mixed with nitric acid in large chambers, or merely by passing the proofed side of waterproof cloth over vessels in which the same reagent is slowly evaporated.

I shall treat almost exclusively of the curing of waterproof cloth, or, more correctly speaking, of the film of rubber which renders the cloth waterproof.

At present there is a revolution taking place in the rubber trade, so far as the vulcanization of waterproof cloth is concerned, in favor of the "dry-heat" versus the "cold-cure" process; and considering the usual disinclination of manufacturers to depart from old methods, it has come with extraordinary suddenness, so much so that it has caused consternation amongst the manufacturers of bisulphide of carbon and chloride of sulphur, whose business will suffer very severely unless new outlets are discovered for their products.

Until within the last two years the majority of rubber manufacturers used the "cold-cure" process almost exclusively for the production of single, and, to a considerable extent, in that of double-texture waterproof garments, and as it was a process which had been gradually developing and increasing for years, its discontinuance was all the more surprising.

In Scotland the manufacturers have all adopted the "dry-heat" process, but in England matters have not so far advanced in this direction, as some of the leading firms still cling to the "cold-cure" as the safest and best process, but no doubt they will be forced to partially adopt it, as "dry-heat" goods are now specially asked for. The "dry-heat" process has been very largely and successfully applied in America, and I think the Americans are to be congratulated as the first to thoroughly work it out, and it is mainly through their experience that manufacturers have been persuaded to adopt it in this country.

Perhaps it would be as well to look at the reasons which have brought about this change of front on the part of rubber-manu-

facturers; and I think this can best be done by stating in a few words the advantages and disadvantages of each process. The advantages of the "cold-cure" process were: (1) the production of what is called a "transparent" proofing, which was and still is, though perhaps in a lesser degree, prized for single-texture garments; (2) the speed and cheapness of the process compared with the "dry-heat"—what I mean by cheapness here has nothing to do with the composition of the proofing, merely the cost for curing; (3) the non-efflorescence of cold-cured goods, which is of much importance, and the reason of which has not been satisfactorily explained.

Digressing for a moment, I shall mention one or two points in connection with efflorescence which may be of interest. How is it that in cold-cured rubber we can have, say, 9 per cent. of sulphur present without efflorescence, when in the "dry-heat" process 3 per cent. is dangerous? Some may say it is accounted for by the rubber never having been heated above the melting point of sulphur, but I tested this idea by heating pieces of cold-cured rubber containing more than 6 per cent. of sulphur above its melting point, but found no efflorescence. This may be a possible explanation. Some time ago a paper was read before the British Association by Thomson (1890, p. 785), in which he stated that when rubber was cold-cured it contained not only sulphur, but chlorine, the latter element being almost invariably double of the former. Now it occurred to me that the non-efflorescence of cold-cured might be accounted for by the sulphur and chlorine existing together in the rubber in combination.

Of course it might be advanced as a reason against such a theory that the greater part of the sulphur can be extracted with bisulphide of carbon, which fact I mentioned in a paper read before this society in 1889, but although such is the case, may not the chlorine be extracted at the same time, which would no doubt be the case if it existed as a compound? I am sorry at not having proved or disproved this idea, but want of time has prevented me.

Now, as regards the disadvantages of the cold-cure process—

I. The chief cause which led manufacturers to embrace the "dry-heat" process was the loss occasioned by damaged goods when using the cold-cure process, and the damage often arose from causes which, apparently, could not be explained. The blame was usually put upon the oil contained in cloth, but I think this was only occasionally the real cause, and my sympathy was often on the side of the cloth-manufacturers, who usually, rather than lose a customer, paid the claim put upon them. No doubt manufacturers often made mixings which were unsuited for this process, but naturally preferred to throw the blame on other shoulders.

II. The injurious action of the vapor of bisulphide of carbon on the workmen employed in attending to the "curing" machines. In some works this is reduced to a minimum and is not urged as an objection, but it is not the case in the majority of manufactories.

III. It is put forward by the majority of firms that cold-cured goods do not stand hot or cold climates so well as could be desired, the strong light, combined with the heat and perspiration from the body, exerting a powerful decomposing action in

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hot climates. The light is, I think, the chief agent in bringing about the mischief.

IV. It is not possible to adulterate the rubber so easily when using chloride of sulphur as the curing agent, which in these days of low prices is of great importance.

My experience so far has been that a piece of rubber cold-cured properly is the most perfectly vulcanized of any made, but the conditions which insure, say of a piece of sheet being so cured, are perhaps not possible in the case of proofed cloth, at any rate not easily attainable.

The advantages of the "dry-heat" process are mostly implied by the disadvantages of the cold-cure process just mentioned, for—Firstly, there is comparatively little claim for damaged goods, and cloths can be used containing a proportion of oil which would be inadmissible in the cold-cure process. Now, although the damage arising from the action of the cloth on the proofing is in the dry heat much reduced, yet it must not be inferred that it is entirely absent, as it is noticed with poor quality of black and brown cloths that 12 months is about sufficient to cause the decomposition of good proofing. This is due to the mordants and dyes used. Secondly, the use of bisulphide of carbon is avoided. Thirdly, the proofing is said to stand extreme heat and cold better than that made by the cold-cure. Fourthly, a cheap proofing can be worked.

As regards the disadvantages of dry-heat process, we have—

I. The danger from efflorescence which has been the chief cause of complaint against manufacturers; and as black paramattas are coming more into fashion, this is a point of much importance.

II. The large amount of stove space required to turn out a large quantity of waterproof cloth.

III. The cost per yard for curing is double that of the cold-cure; no doubt this is made up for by being able to use a cheaper proofing, but it is a point in favor of the older process.

IV. The non-possibility of producing "transparent" proofing which is distinguished from ordinary "dry-heat" proofing by its softness and elasticity as well as its transparency.

It may be asked why not use the "steam" process for curing waterproof cloth when it is used for other goods; and the answer is that although it would cure the rubber well and with less danger of efflorescence than with "dry-heat," yet it is fatal to the colors of the cloth and also to the cloth itself. Before the "dry-heat" process came in it was used, but never to a large extent except for black and white sheeting.

What is the "beau ideal" of a vulcanized process for waterproof cloth? This question is difficult to answer satisfactorily, but I should say it would be fulfilled by a process which in the shortest time and at the lowest temperature, consistent with a sound vulcanization, would produce a proofing which would stand the hottest and coldest climates, and not effloresce, and at the same time could without unusual difficulties be produced at a cost which would enable manufacturers to use it even for cheap goods.

When manufacturers who had been accustomed to work with steam and cold-cure processes began to face the "dry-heat" process, a few difficulties presented themselves, which were not easily overcome. For instance, if you take a piece of rubber mixed with 4 per cent. of sulphur, and heat to 250° F. in a "dry-heat" stove, it becomes soft and unfit for use, but if the same piece were steam-heated it would cure up satisfactorily. To overcome this, quite a different class of mixings had to be arranged to satisfy each quality of proofing. Again, the difficulty of avoiding efflorescence and at the same time get a satisfactory vulcanization caused considerable trouble, and the experience was often gained through the loss of custom, because

time is the factor which tells most forcibly as a test on rubber goods. Again, buyers who had been accustomed to purchase the finely-finished transparent garments with a velvety feel and good elasticity did not readily take to single-texture goods with dark proofing, and not so soft to the touch and with less elasticity. Of course, for light cloths it is not of great importance to avoid efflorescence, but for black or dark cloths it is necessary to avoid it completely. This efflorescence could be avoided by using a high temperature or a long-continued heat, but then the cloth suffered. In fact woolen cloth is found to "tender" slightly at 240° F., hence the importance of using a low heat and short time, both being consistent of course with a sound proofing. With ordinary "dry-heat" proofing we cannot look for a lower temperature than 238° F., as sulphur melts at that heat, and anything below this is of no use; hence the obvious necessity of bringing up the heat of the stove as quickly as possible to this temperature. As regards the duration of the heat, it altogether depends on the composition of the proofing; but, as a rule, however, for good proofing one to two hours at 240-245° F. reckoned from the time the temperature reaches 240° F. is about what is required.

The management and construction of the stoves require considerable practical knowledge. Steam at 10 pounds pressure would be more than sufficient to produce a temperature of 238° F., assuming that no heat was lost by radiation and convection, but for large stoves nothing less than 60 pounds is used, and it is more economical to work with a still higher pressure, as the heat can be brought up more quickly to the melting point of sulphur, and so more work can be got out of the stove in a given time.

About two years ago my firm was asked for a vulcanizer which would be suitable for the production of transparent proofing by the "dry-heat" process, and as I thought such a thing quite feasible I had a series of trials conducted which resulted in the production of a vulcanizer which answered the purpose, and has been found to be useful, not only for that special class of work, but also for other purposes which had not been anticipated. After completing the laboratory trials, the North British Rubber Co., who have had the longest experience in the "dry-heat" process of any firm in Great Britain, kindly undertook the practical trials, and under the superintendence of Mr. A. Douglas, during 1891, carried them to a successful issue, in so far that they have proved it suitable for the production of "transparent" proofing, and also have introduced it into the manufacture of other goods, such as fishing-stockings.

Through their kindness I am able to show you to-night samples of some of the goods which they are now producing, and the more important of which are the pair of fishing-trousers which Mr. Douglas got made for his own use last October, and although they have been in use since that time, are in very good order; also a new pair of fishing-stockings, which show very well the nature of the proofing. The color you will notice is odd, and can no doubt be improved, but what is wanted in these goods is a good tough proofing, irrespective of appearance. I am informed, moreover, that these stockings if damaged can be repaired, which is a special property. We have also two samples of transparent proofing, which serve to show the results which can be obtained in this direction.

I had hoped Mr. Douglas would be present to-night to explain the chief points of difference between these sample goods and those made by other processes, but as he was prevented from coming he wrote to me, and, after giving a list of the articles, he goes on to say:

"The fishing-goods are spread with pure gum, with 4 per cent. of patent vulcanizer. They are heated for two hours, 50

minutes of that time being at 240° F. The rubber is exceedingly tough, more so than it would be by any other process, and the short and low temperature reduce the risk of tendering the fabric very considerably. The two 'transparent' samples are spread with the same gum as the fishing-stockings. The silk one was spread July, 1891, and vulcanized three-quarters of an hour at 240° F.; while the union silk was spread last week, and heated one hour 240° F. This gum, more particularly in very light-spread goods, has a very soft and agreeable feel, and looks well, but I am afraid the high price of your patent vulcanizer will seriously interfere with its adoption by manufacturers for the single-texture waterproof-garment trade, which is to be regretted, as I consider it the best form of vulcanization at present known for these goods."

I have here also samples of colored sheet-rubber, kindly prepared for me by Messrs. W. Warne & Co., which contain only 2 per cent. of vulcanizer. The vulcanizers used in these trials were the iodides of the heavy metals mixed with sulphur. In my patent I claim all iodine and bromine compounds, but, so far, have found those of the heavy metals to give the best results. The addition of sulphur was found to be necessary, as without it it was impossible to obtain good results.

The points which were forcibly brought out during the trials were: First, the very small percentage of compound which was necessary to insure complete vulcanization. The iodide could be reduced to 1½ per cent., whilst the sulphur was 2 per cent., and you can well understand that 3½ per cent. of compound would not affect, to any extent, the transparency of the rubber. Second, the low heat required for complete vulcanization. This seems a very important point, as most manufacturers experience great difficulty in getting a satisfactory "cure" at a temperature which does not injure the cloth. The extreme sensitiveness of the vulcanizer to heat caused a little trouble at the commencement of the trials, as they were conducted too much on the lines of the ordinary "dry-heat" mixings. I remember the first trials which were made had as much as 15 per cent. of the iodide and 6 per cent. of sulphur, and the astonishing thing was that these samples cured at 200-205° F., considerably below the melting point of sulphur, which was very unusual, and proves that whatever action takes place it does so in a manner quite different from the ordinary process in which no action is apparent below 238° F., although a considerable proportion of the "curing" agent is present. Of course, when using such a high percentage of the vulcanizer, you can naturally imagine that a large proportion remains unexhausted, and is ready to still further affect the rubber. This was proved by heating a piece of such rubber to 240-245° F. for but 39 minutes, when it became quite hard. The property possessed by this vulcanizer of exerting a curative effect considerably below 238° F., although of little practical importance at present, may at some future time receive useful application."

Thirdly, the quickness of the cure was rather surprising, as half an hour was sufficient when using 3 per cent. vulcanizer and 2 per cent. sulphur, and when using a high percentage along with a high temperature the "cure" was effected in a few minutes. With 15 per cent., ten minutes at 250° F. would suffice.

A quick cure is regarded by some rubber authorities with suspicion, and, I think, naturally, as the ordinary method employed, and which must force itself upon the mind for comparison, does not cure under two hours at 238° F. I found that with this new compound it was safest to use a small percentage and lengthen the heat, but an hour seemed sufficient for all ordinary purposes, using, say 2-3 per cent. with 2 per cent. of sulphur. With these proportions the curing agent seems to be exhausted after one hour's heating. To prove this, a piece of

mixed rubber was cut into two pieces; one was heated for one hour at 240° F., and the other for five hours, when they were both equally cured, showing that with the extra 3½ hours heating no further effect was produced. The fact of the vulcanizer curing so quickly and at such a low temperature is a saving in that more work can be got out of a stove in a given time, which is of considerable advantage in the "dry-heat," as large stoves are required to put through a large quantity of cloth.

The continuous stove patented by Waddington and worked by Messrs. Charles Macintosh & Co. and others, through which the cloth is slowly drawn, ascending and descending many times before it is finally wound upon a roller on the outside, seems to be a move in the right direction, as by this system the cloth can be tested occasionally, and the speed of the rollers regulated according as to whether the proofing is over- or under-cured; it also prevents the creasing and marking of the proofing, which is a common occurrence in ordinary stoves. This system of curing would be specially applicable when using this new vulcanizer, seeing it is more sensitive to heat than that used for ordinary work.

While working with this vulcanizer a difficulty presented itself which caused some trouble, although a simple remedy was found to obviate it. When working with woolen and almost all kinds of union tweeds, the proofing cured up quite satisfactorily, but when working with cotton cloths containing black and brown dyed yarn the proofing became tacky and refused to cure quite satisfactorily. It was very noticeable with, say a piece of black and white check cotton cloth, because wherever the proofing was upon the black squares it was soft and under-cured, but upon the white squares it was quite cured, and in every respect satisfactorily. Seeing that black woolen cloth was free from this peculiar action, it could only be caused by the different manner in which the dyes were fixed in the two cases. In the case of the cotton, the mordanting material was thought either alone or in combination with the dyestuff to cause the mischief. It being difficult to tell what colors were to blame in cloths containing many colors, I procured cotton-dyed yarn of different colors, and got them knitted into strips, which were then spread with rubber dough containing a proportion of vulcanizer which was known to be more than sufficient to cure it. After curing for two hours at 240-245° F., the proofing on the white, blues, drabs, and certain shades of brown was quite vulcanized, but on the black and dark browns it was under-cured.

As the black cloth had caused the most trouble, attention was specially directed to it, to find out, if possible, the cause of this action. In the first place the opinion of an experienced dyer was taken as to the probable process used in dyeing the yarn. After a critical examination he reported that the mordant was iron liquor, the "prepared" tannin, and the dye logwood. Three pieces of white cotton cloth were next taken, and after well scouring and drying treated as follows:

- No. 1 soaked in a solution of iron liquor.
- No. 2 soaked in a solution of tannic acid.
- No. 3 soaked in a solution of logwood.

They were now dried and spread with rubber dough of same composition as that previously used. After drying they were cured two hours at about 240° F., and it was found that in each case the proofing was sound, so separately the reagents did not interfere with the curing. Next, three pieces of cloth were taken, scoured, and treated as follows:

- No. 1 dipped iron liquor, afterwards tannic acid.
- No. 2 dipped iron liquor, afterwards logwood extract.
- No. 3 dipped iron liquor, then tannic acid, then logwood extract.

After drying they were spread with rubber dough and cured



as before, when No. 1 cured, but not Nos. 2 and 3, proving apparently that it was the compound produced between iron oxide and coloring matter of the logwood which accounted for the mischief. Want of time prevented me from going further into the matter, and trying if possible to find what the cause of this action was, *i. e.*, how could this dye compound so influence the iodide or the mixture of iodide and sulphur as to retard its curative action. It almost looked as if the dye compound so affected or combined with the sulphur as to render it less available for the iodide, as the addition of extra sulphur was found to be an antidote as regards the curing, but was inadmissible when working with black cloth because of danger from efflorescence. It was suggested, as a probable explanation, that the tweed cloths which are usually sold might contain some of the mordant unwashed-out, or greasy matter, so pieces of such cloths, containing a good admixture of black and brown were treated as follows:

No. 1 treated three times with ether, to remove grease.

No. 2 boiled three times in water.

No. 3 boiled weak acid, then water.

No. 4 boiled weak alkali, then water.

After drying they were spread and cured two hours 240° F., but the proofing was useless, which disproved the theory of grease or mordanting material being left in the cloth.

It has long been known that copper and certain of its compounds exert a deleterious effect on rubber, and this was brought forward lately by Thomson,\* but in the above examples copper was absent.

I asked Mr. Christie, of Messrs. J. Orr Ewing & Co., who has had a large experience in the dyeing of cotton yarns, if he could offer an explanation, and he thought the reason might be the presence of peroxide of iron, and suggested the procuring of a piece of buff cotton cloth, much used for window-blinds, and which, he said, would be free from all foreign matter, such as tannic acid and logwood, used in dyeing black and brown yarn. I did this, and found that the action of the vulcanizer was retarded, almost proving that the iron oxide was the cause of the mischief; but if this were proved, the next question would be, what is the reaction which takes place? Although this action was peculiar, and, in the meantime, to me inexplicable, yet a simple remedy was found to allow of its being used on cotton cloths. This consisted, in the first place, in giving the cloth a coat of pure rubber dough, mixed with 2 per cent. of sulphur, and which is often resorted to in ordinary "dry-heat" process to avoid "efflorescence."

The action of dyed cloth on rubber proofing is an important question, not only for the rubber-manufacturers but also for dyers, and it seems to me that the solving of the problem should not be left to manufacturers, but to the dyeing-schools, who, so far as I know, have given the matter little or no attention, and some of the wealthy rubber-manufacturers could, with advantage, encourage the investigation of such questions in the technical schools.

An important point in connection with the use of this new vulcanizer is, that by its means colored rubber proofing can be easily obtained without adding a large amount of pigment to the rubber. In the ordinary "dry-heat" process it is difficult to get a good colored "proofing," and at the same time keep the proportion of compound so low that it will be elastic. With this vulcanizer, however, brown, drab, red, blue and green proofings can be obtained.

I have here a few samples of colored proofings which Messrs. Campbell, Achnach & Co. kindly prepared for me, and you can judge better of their appearance and softness to the touch by

inspection. Of course, if wanted, the pigment can be increased, as I have had 360 per cent. added, and still the rubber was strong and elastic. The colored proofings cured up in a time according to the percentage of vulcanizer and compounding material added, but the usual time was three-quarters of an hour at 240-245° F.

It mixes very well with most pigments, but there are some which retard its action. It appears to me that proofing cured with it could be finished without farina, as the surface after curing is very dry and soft, and, if so, it would be a point in its favor, as farina seems to exert a deleterious action on the surface of the rubber, no doubt through its getting damp and fermenting; besides, farina comes off when wet upon the cloths and leaves marks, which is objectionable.

Two most important questions in regard to the introduction of this new vulcanizer are, as to its keeping qualities and its cost.

First, as regards its durability, it is impossible to give an answer based on long experience; but when one takes into account the fact that the samples which were made in the preliminary trials fifteen months ago are still in good condition, it is surprising, as too much vulcanizer was used, and the method of working has been much improved. There can be no question, I think, that the "transparent" dry-heat proofing will stand better than that cold-cured in warm climates. To test their heat-resisting properties, a piece of each of these kinds of proofing, and also a piece of that which had been cured by ordinary "dry-heat" process were taken and heated to 300° F. for half an hour. The cold-cured piece was simply rotted away; the ordinary dry-heated piece had quite decomposed, while that cured by the new vulcanizer was but slightly so, showing that it was not readily affected by heat. Judging from my own experience, and the interchange of opinion I have had with Mr. Douglas and others, I conclude that there is every probability that the rubber will keep as well as the ordinary "dry-heat" rubber.

Second, as regards the cost. At first sight it would appear as if the cost would be such as to preclude it from general use, but on looking more closely into the question it wears a different aspect. Taking the average weight of "transparent" proofing on a coat at two pounds, we have for this weight 4d worth of vulcanizer. Now there falls to be deducted from this the cost of curing by the ordinary method, which is about one penny, and we must also take into account that by the rapid curing a considerable saving is effected, so the difference in price is certainly not prohibitive. If it is compounded, of course the price can be reduced to that of ordinary curing.

It may be asked if this compound will mix with rubber substitutes, and I may say that the ordinary oil substitute made with chloride of sulphur is quite as unsuitable as it is for all "dry-heat" work. Oil vulcanized with sulphur by heat is suitable, but the admixture of different substances is one which can be determined only by the manufacturers themselves.

The cheapening of rubber by adding different foreign materials has become quite an art, and a necessary one, no doubt, and something will soon be found which will serve as an article to cheapen the mixing with the new compound also. It has been tried for double- as well as single-texture garments, and is very serviceable where a nice pliable proofing is wanted and when a cloth is being dealt with which is easily affected by heat.

It is principally in connection with "dry-heat" that it has been tried, but it gives good results in the steam-heater when wrapped up to protect it partially from the steam. I have here a piece of sheet-rubber cured 2½ hours at 260° F., which shows that by this process it is possible to bring about good vulcanization, as the rubber, you will notice, is very strong.

\* *India-Rubber Journal*, 1891, page 398.



## THE CHEMISTRY OF RUBBER INGREDIENTS AND ADULTERANTS.

*By Henry J. Williams, Chemist.\**

## V.—LAMPBLACK AND BONE-BLACK.

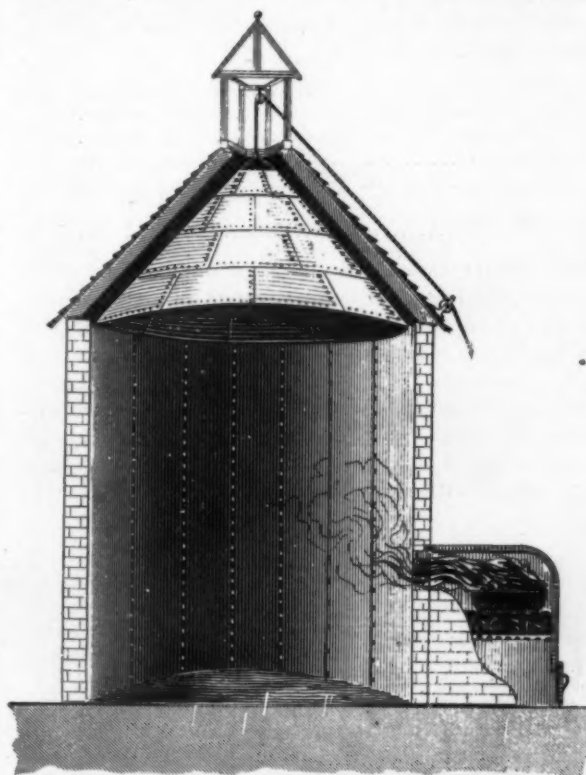
WHEN combustible bodies such as wax, fat, coal-gas and other hydro-carbons undergo combustion, the hydrogen which these substances contain is the first element to undergo oxidation or be consumed, while the carbon, especially if the flame be suddenly cooled by bringing a cold surface in contact with it, may almost entirely escape combustion and be deposited. When the burning substance is very rich in carbon the flame may smoke without being cooled and it will do so all the more strongly, the less the supply of air present. This simple fact is the basis which underlies all processes for the manufacture of finely divided carbon or lampblack.

Lampblack is obtained on a large scale by collecting the smoke produced during the imperfect combustion of oils, fats, resins, coal-gas, tar, wood-tar, petroleum residues, dead oil, soft woods of the nature of pine, pitch-pine, and even bituminous coal. These substances all yield lampblack of various grades of quality. The operation is quite simple and consists merely in consuming all the constituents of the burning body except the carbon and preserving as much of that as possible. Lampblack is prepared in large quantities, by the manufacturers of turpentine, from the impure resins and other refuse matters that remain after the distillation of the turpentine. These are burned in iron pots or furnaces supplied with a very limited access of air, the dense smoke produced by the combustion being conveyed into chambers hung with sacking upon the surface of which the lampblack is deposited. It is scraped or shaken off from time to time.

The accompanying illustration shows the arrangement of the apparatus generally used. It consists of a cylindrical brick chamber ten or fifteen feet in diameter, provided with a conical roof which has a small opening near its apex, sufficiently large to maintain a slight draft and which causes the smoke to ascend towards the upper part of the chamber. A cone of sheet iron hangs within the cylinder and this too has a small hole at the top to allow the gases to escape. At the side and base of the chamber there is a kind of furnace above the fire of which is placed a pan containing resinous or fatty matters which are heated to a point sufficient to convert them into vapor. Then this vapor undergoes sufficient combustion to deprive it of its hydrogen while most of the carbon remains unconsumed. The smoke ascends into the chamber and is mostly deposited upon the hanging canvas or sacking which covers the walls and upon the inner surface of the iron cone from which it falls after a certain thickness has collected. The cone is so held by a chain and pulley that it may be raised or lowered, which operation scrapes the lampblack off the sacking. The lampblack thus prepared

is not pure carbon, as it is mingled with resinous and bituminous substances, together with ammoniacal and other matters. By heating it to full redness in retorts which are air-tight, nearly all these impurities are driven off and an almost pure impalpable black powder remains.

In most cases the process just described is slightly modified and not only ordinary lampblack but the better grades too are obtained at the same time. This is brought about by interposing, between the fireplace and the soot chamber



INTERIOR OF SOOT CHAMBER FOR THE MANUFACTURE OF LAMPBLACK.

just described, a brickwork gallery or flue fourteen feet long in which the inferior tarry material deposits itself. A series of chambers or condensers may follow in which the successive deposits increase in fineness and value until the last chamber which contains the conical hood receives the finest lampblack of all.

By another process gases are burnt with an insufficient supply of air while a metallic cylinder, generally made of tin, revolves in the flame and cools it sufficiently to bring about an abundant deposition of lampblack. Of late years large quantities of lampblack have been manufactured in this way from natural gas, at Pittsburgh, Pa. The lampblack is brushed off automatically as the cylinder re-

\*Member British Society of Chemical Industry; Deut. Chem. Gesell., and Am. Institute of Mining Engineers.

volves. Other kinds of black are made and used in the arts, such as Spanish black, which is made from cork; vine-black from vine-tendrils, and peach-black, which has a bluish color, from peach-kernels. Good lampblack should be impalpable, free from dirt and much moisture and should leave little or no ash on combustion.

Bone-black, also called animal charcoal and sometimes ivory-black, is a black carbonaceous powder obtained by grinding the product of bones burned at a red heat in closed vessels. The name ivory-black should properly be limited to the finer and more expensive article prepared from ivory dust or turnings. When bones are subjected to heat during the process of making bone-black, certain volatile products are given off, consisting of an empyreumatic oil, fetid gases and ammoniacal vapors. The ammonia may be collected but the other products are generally burned. The fixed product which constitutes bone-black consists approximately of—

Phosphate of lime.....	78	per cent.
Phosphate of magnesia.....	1.5	per cent.
Carbonate of lime .....	8.5	per cent.
Carbon.....	10.	per cent.
Impurities, Silica, Iron, etc.....	2.	per cent.
Total.....	100.0	per cent.

The powder resembles that of vegetable charcoal but is more dense and less combustible, while its ashes are less soluble in sulphuric acid than those of charcoal. The process of making bone-black varies according as the ammonia vapors are saved or allowed to go to waste. In the former case the bones, freed from fatty matter, flesh and tendons, are carbonized in closed retorts of fire-clay or cast-iron, in furnaces not unlike those used in the manufacture of coal-gas. A connection with the condensing apparatus is made by

means of 3-inch pipes, but the volatile products, aside from ammonia, are either allowed to escape or discharged under the fire where they afford heat and save fuel, while their offensive odor is destroyed. When the retorts have been subjected to a red heat for thirty-six hours the charred bones are raked, while hot, into a box which is then hermetically closed till they are cold. They are then ground in mills.

The better quality of bone-black, however, is made by the second process, where the volatile products are entirely disregarded. Here the bones are placed in cast-iron pots containing each about twenty-five pounds, which are then placed together in pairs, mouth to mouth and luted with clay. These pots are then piled in columns, to the number of 100 or 150, in a sort of kiln, the entrances to which are tightly bricked up except those for the admission of the flame and opening into the chimney. The pots are well heated for sixteen to eighteen hours by the flame playing around them and the heat is increased by the combustion of the combustible vapors which issue from the bones. Finally the contents of the furnace are allowed to cool and the pots are taken out and when thoroughly cold, opened and the product ground.

Good bone-black should have a dull even black color on fracture, and should cling when applied to the tongue; where the grains have a glistening appearance the quality is not so good. A charge of bones yields about 50 per cent. of its weight in the form of bone-black.

The quality and depth of shade of both lampblack and bone-black are generally judged by mixing a certain weight of either with a known weight of dry white-lead and comparing the resulting shades with those obtained with similar proportions of standard lampblacks or bone-blacks.

## AMAZON NAVIGATION AND BRITISH INTERESTS.

THE principal steamboat line on the river Amazon, of which some particulars were given by our Pará correspondent in the last INDIA RUBBER WORLD, has reverted to its former English owners, who are now considerably "ahead" through the addition to their resources of the first payment made by the Brazilian buyers and forfeited through the failure of the latter to make the final payment required. This "windfall" is to be expended in the purchase of new steamboats, the effect of this turn in affairs being to strengthen British interests in the Amazon valley. The extent of the business of this line is exhibited by the nineteenth annual report [for 1890] now before us, which represents its income from gross earnings at \$1,096,244 and from governmental subsidies at \$406,000, a total of \$1,502,244. After deducting charges of all kinds a profit of \$290,592 is shown, on a capitalization of \$2,526,187. The following details are gained from *The European Mail* [London] of June 16:

"The agreement between the Amazon Steam Navigation Co. and the Empresa das Obras Publicas no Brazil has

just been cancelled by the board of the former undertaking, owing to the failure of the latter concern to keep up the instalments as arranged. The Amazon steamship company agreed to part with their business to the Brazilian enterprise for £808,380, which was to be paid in monthly instalments of £6363, until August of this year, when the money still due—about £608,380—was to have been handed over in a lump sum. Nearly £155,500 have been paid, but since February 16 the instalments have ceased. By the conditions of the agreement, in case of default, the steamship company has the right to withdraw from the contract and confiscate the amount already paid. Of this right the directors have now availed themselves, and the Empresa das Obras Publicas no Brazil is left lamenting.

"The report of the Amazon Steam Navigation Co., just issued, sets at rest the surmises which have been rife as to what the directors proposed to do with the money forfeited by the Empresa das Obras Publicas no Brazil. Of this sum £20,200 is to be distributed in a bonus of 10s. a share, and the remaining £135,250 is to be devoted to "the purpose

of strengthening the company in the difficult condition of affairs now prevailing in Brazil," and of supplying new steamers to the fleet. The directors have done wisely in putting the greater part of their windfall to this use, and the generosity which they have displayed towards the Brazilian company over the affair will effectually prevent any twinge of conscience which they might otherwise have felt in using the confiscated cash.

"That the falling through of the agreement for the sale of the Amazon Steam Navigation Co.'s property was a fortunate event for the shareholders has, of course, been recognized on all hands. Mr. H. Guillaume, of Southampton, thinks it will prove a good thing for British traders on the Amazon also. The reports recently received from travelers on the upper river, he says, show that the country is well adapted in point of climate and fertility of soil for

European colonization, and already pioneer colonists (Italians) are being sent out as an initial experiment. Besides the valuable crops of India-rubber, coffee, cotton, tobacco, etc., mineral deposits, among them gold, exist in payable qualities, and only require the application of capital to yield valuable results. Stern-wheel steamers of light draught are especially adapted for the navigation of the upper river, by which trading could be carried on very advantageously. At present the whole of the trading is in the hands of the various tribes of Indians, who number in the aggregate about 160,000. Fish-hooks, beads, and calico are eagerly bought by the natives in exchange for gold dust, India-rubber, etc., and large profits could easily be realized by European traders. It would surprise no one, therefore, if British capital commenced shortly to flow into Amazonian channels."

### A GOOD YEAR IN THE RUBBER TRADE.

**A** RESUME of the rubber business for twelve months past shows a decided change for the better in every direction, with an outlook of a very encouraging nature. One year ago the position of crude rubber was in an artificial condition caused by the attempt of Baron de Gondoriz to control the output at Pará. The story of that attempt has been often told; suffice it to say here that prices had been inflated to a point above 90 cents, when the crash came. Prices receded to a point below 60 cents, and manufacturers were allowed to obtain a sufficiency for their needs for some time. As usual after such attempts, the stocks and deliveries became large, reaching their maximum in the early part of this year, since which time the market has been in a normal condition. There is a disposition at present, so far as it is practicable, to allow the market to remain so, importers believing that it is better for the trade generally to have prices move along naturally, and they are inclined to disfavor anything which will enhance quotations without good reasons. The opinion is expressed, however, that if consumption keeps on at its present pace, higher prices must naturally ensue, in view of depleted stocks which cannot be largely augmented for several months to come.

Supplies at this time seem to be decreasing gradually, and this is true of other sorts than Pará rubber. Trading companies remark that the Panama steamers bring less and less rubber to this country, and for some time little or none has come through that channel. The arrivals of Centrals through other sources varies in volume from month to month, but importers say that the output of Nicaragua is not so certain as it was. As was the case at Panama, labor in Nicaragua is diverted to the new canal enterprise, with a diminished gathering of crude rubber. The African trade is normal, and in Gutta-percha the business is trifling.

In consumption every branch seems to be on an enlarged scale. The boot-and-shoe men have had a busy year, favored by months of bad weather. The tennis-shoe has been boomed by a "craze," and in other lines a marked

improvement has been the rule. At present all are busy at a time when manufacturers would be glad to restrict operations on account of the difficulty of vulcanizing goods properly at this season of the year. The outlook for the fall is a good one, stocks being low and calling for prompt "details" for the remainder of the season. In clothing the year opened with a poor outlook. Sales were spasmodic, but latterly the demand has been waxing strong, and now manufacturers are very cheerful as to the outlook. Stocks are low, and while the general opinion is that there will be no "boom," all agree that the trade is in a very healthy condition. Cloth-men are enthusiastic and believe that the rank and file are underestimating the future, but this branch has in the past been so depressed, and prices have been so variable, that caution has become second nature.

In mechanical goods the year has been a good one. Twelve months ago this branch was prostrated by the sensational failures at Trenton, N. J., and the fear that others would follow has been uppermost almost down to the present time. A great wheat crop, however, called for enormous quantities of belting; a revival in manufacturing and an enlargement of transportation facilities increased the demand for packing; an enormous fruit crop helped the sale of jar-rings; everybody seemed to want garden-hose; the railroads all at once began to order steam-and air-brake hose in very large quantities; then the rubber mat drove the iron makeshift out of the market; the bicycle-men came forward in a phenomenal manner—in short everything seemed to run to rubber, and mechanical-goods men became prosperous, if long hours were a criterion by which to judge, and at present the feeling among the trade is one of confidence.

In druggists' sundries the year has been a good one, manufacturers enlarging their production in many lines. New articles come forward and are taken by the public in a very gratifying manner. In toys, the demand which is chiefly an incident of the holiday season, shows a steady improvement for domestic manufacturers. In hard-rubber



goods there is an enlarged volume of goods being sold. In electrical lines the demand is ever increasing.

The thousand and one articles of which rubber forms a component part are constantly increasing in volume of output. The demand for air-goods is gaged by steps which never go downward. Dress-shield and dental-goods men are very apt at times to pull down the curtains and laugh at results. Suspender manufactories are springing up in various parts of the country. The demand for goring is becoming better as an improvement in quality is made, and although the webbing people are inclined to complain, the industry is in a fairly prosperous condition.

The chief drawback is small profits. With the great output in every line no one seems to be able to permanently advance prices. Mechanical-goods men, however, have done this to some extent, but competition is yet keen with them. The uncertainty of carrying on transactions on an immense scale at a reduced margin of profit makes some manufacturers anxious as to the balance-sheet at the end of the calendar year, but it is believed that all are on the side of prudence, and the final result will prove a good one.

All in all, rubber industries are in excellent shape, the reverse of what they were a year ago, when the feeling was one of grave uncertainty.

#### How Rubber Substitute is Made in France.

THERE are of course a great many different kinds of substitute made abroad and French chemists are probably working under a score of different formulæ. A description of a black substitute that is made partly of oxidized oil comes from France and it is given here for what it is worth. In the first place an oil is chosen, usually either linseed or rapeseed, or some of the cheaper oils such as can be easily applied to linen cloths. This is mixed with three parts Trinidad asphalt and this in turn is treated with bisulphide of carbon. The different ingredients are warmed and freed from all sediment and are mixed with a small quantity of clarified resin after which this is spread over the cloth. This of course does not make an absolute substitute for rubber; indeed it is more in the line of a substitute for ordinary oil-cloth. In making a rubber substitute the composition is mixed with a little African rubber and about 5 per cent. of sulphur and a little chalk. This combination when cured produces an inferior ebonite which makes a good insulator. If, however, a certain amount of litharge is added it is said that the ebonite possesses the property of resisting the action of the acids. This composition is sometimes used for imitating leather, and for that purpose it is mixed with coloring matters and treated in a score of different ways. In using a substitute of this kind, one must bear in mind that a large amount of sulphur must be used and the cure must be a long one and at a low temperature.

#### Views of a Rubber Importer.

"THE time will never come when we shall see a permanent scarcity of India-rubber," said an importer of this commodity to a representative of this journal in a recent conversation. "There are tracts of land on the Amazon river so thickly covered with rubber trees that only a monkey can explore them, so large that all the New England States could be thrown in without order into any one of them. The expense of the gathering is simply in the labor. The forests have only been worked on the outskirts and the rubber is there practically without limit. The labor is limited, however. No one but a native can stand the

climate. There are recruits sometimes from Ceará, attracted by the hope of gaining a few dollars, who roam the forests somewhat after the manner of the agricultural tramp in the Northwest, who is always around at harvest time, and who disappears afterwards.

"The only improvement which can be made in enlarging the commerce in rubber on the Amazon is to form some transportation companies with a multitude of small, light-draft steamers which can penetrate places now found out only by the snail-like canoe. The increase in the production of Pará rubber will logically come about, but it has to be done in the Brazilian way, as it would be suicidal on the part of any foreign labor to undertake it, and naturally other than Brazilian capital is at a disadvantage in dealing with the natives. The business methods of the inhabitant of the forest would drive a man used to handling only certified checks, simply crazy.

"An improvement is needed in the way of an uniformity in curing rubber. The rubber is about the same in every part of the Amazon valley, but there are widely-separated districts, and some of the natives are careless naturally and others become so. The deterioration in care in curing is now noticeable on the river Purus, which has heretofore borne a high reputation for the quality of its rubber. One must remember that the farmer in the Northwest is very different in his customs from the plantation owner at the mouth of the Mississippi, and the distances in Brazil are strung out fully as much as they are in this country. There are two points, however, which are settled for a century to come—there is plenty of rubber, and the foreign capitalist cannot go any further than to the Amazonian ports in his efforts to procure it."

#### An English Authority on Gutta-Percha.

IN the course of the recent discussion before the British Institution of Electrical Engineers, Mr. William H. Preece stated that while pure Gutta-percha was cheap and abundant thirty years ago, when the trade was all in the hands of one firm, at the present day there was absolutely no unadulterated Gutta-percha to be had in the market. He said that in instances within his knowledge, the use in a submarine cable of the sophisticated material had proved disastrous, the cable becoming wholly useless within three or four years.

## RECENT RUBBER PATENTS.

**A**MONG recent patents issued by the United States Patent-Office, embodying applications of India-rubber or Gutta-percha, to a greater or less extent, have been the following. It is not practicable here to do more than to note the use of rubber in each case, with sufficient detail to enable those who are interested to decide whether or not to look into any particular patent more fully:

No. 472,267.—*Buffing-Wheel*. William W. Crooker, Lynn, Mass., assignor, by mesne assignments, to the Electric Boot and Shoe Furnishing Co. of Maine.

A medium for polishing parts of boots or shoes, consisting of a wheel capable of rapid rotation, provided upon its periphery with a hollow inflatable air-tight cushion, and means for inflating it to varying degrees of firmness or solidity, and covered with a non-abrasive material.

No. 472,341.—*Vehicle-Tire*. Frank Douglas, Chicago, Ill.

In inflatable vehicle-tires, an inner tube and an outer tube having its outer edges detached from the inner tube to permit of attachment to the wheel-rim, in combination with a wheel-rim provided with a flexible bridge formed by extending one of the layers composing the outer tube across the wheel-rim, and against which the inner tube rests.

No. 472,352.—*Compound for Insulating Electric Wires*. Louis Hill, Waterbury, Conn.

A compound for insulating wire, consisting of pitzite pitch, candle-tar, coal-tar, asphalt pitch, and rosin.

No. 472,411.—*Pneumatic Tire*. George W. Toney, Westborough, and Murray V. Livingston, Newton, Mass.

A cushion-tire consisting of a single piece of elastic material formed with an annular internal base portion, annular air-chamber, auxiliary side-chambers at opposite sides of the base portion, and a pair of independent laterally-movable curved flaps or wings, having their adjacent edges separated by an annular division slot for the purpose of springing such flaps or wings around opposite sides of a wheel-rim.

No. 472,484.—*Pneumatic Tire*. Lucius J. Phelps, Passaic, N. J.

A pneumatic tire having a cushion formed of a rope of loose yielding material extending through and partially filling the air-chamber and having its ends united.

No. 472,485.—*Inflatable Tube*. Lucius J. Phelps, Passaic, N. J.

An inflation-tube having a tube formed of a plurality of independent layers of thin compressed rubber, a tube outside the same formed of a single comparatively thick layer of compressed rubber, a tube of expanded rubber outside the latter, and a cover outside the expanded tube.

No. 472,543.—*Electric Conductor*. William E. Patterson, Chicago, Ill.

An electrical conductor insulated with a composite covering of fibrous material and waterproof insulation, the waterproof insulation forming the entire outer coating of the covering and alternating with the fibrous insulation in longitudinal annular sections next the conductor.

No. 472,786.—*Bicycle-Tire*. Edward G. Dorchester, Geneva, N. Y.

In combination with the wheel-rim, two outer tubes arranged one within the other and the inner compressed lengthwise, a lining secured to the inner tube, a reinforcing-layer interposed between the outer tube and the wheel-rim, and a sheath enveloping the outer tube and lapping onto the inner side of the wheel-rim and secured thereto.

No. 473,003.—*Slate-Cleaner*. Alfred Thurber, San Pablo, Cal.

The combination, in a slate-cleaner, of the block with the

groove holding the sand-paper, emery cloth, or file, the rubber and the radially-slotted fur felt.

No. 473,034.—*Pneumatic Tire*. Emil Ulbricht, Chicago, Ill.

A pneumatic wheel-tire comprising a couple of tubes confined within an annular holder or pocket covering adapted to compel the tubes when inflated to flatten along their opposing annular portions, and thereby assume a substantially segmental shape in cross-section.

No. 473,267.—*Electric Cable*. William H. Sawyer, Providence, R. I., assignor to the American Electrical Works, same place.

An electric cable formed of a number of sections, each composed of a series of wires interbraided with fibrous material into tubular form to provide a base or core for the reception of a successive series of wires similarly braided thereon, the wires of the first series being braided in the opposite direction to that of the successive series and all the wires being approximately equidistant.

No. 473,351.—*Electric Cable*. William H. Sawyer, Providence, R. I., assignor to the American Electrical Works, same place.

In an electric cable, the combination of a number of sections, each composed of a flexible tube or core formed of two wires of a metallic circuit coiled spirally together, a successive series of metallic circuits interbraided with fibrous material upon said tube or core, and an inclosing sheath or other suitable covering.

No. 473,352.—*Electric Cable*. William H. Sawyer, Providence, R. I., assignor to American Electrical Works, same place.

An electric cable, formed of a number of sections grouped together, each section being composed of a series of insulated wires or conductors interbraided with fibrous material into a continuous flat strip or ribbon, which is wound or twisted into a spiral tube having a central air-space, and one or more strips or ribbons similarly constructed being wound upon said spiral tube in reverse directions and the whole inclosed within a lead sheath or other suitable covering.

No. 473,408.—*Wheel for Velocipedes*. Charles D. Rice, Hartford, Conn., assignor to the Pope Manufacturing Co., Portland, Me.

In a wheel substantially such as described, a rim constructed with a central annular seat for the support of the tire and with an annular groove at each side of said tire-seat, combined with an elastic or flexible tire adapted to rest in said seat, a jacket surrounding said tire and constructed with longitudinal pockets corresponding to the said grooves in the rim, and wires through the said pockets secured to the rim of the wheel and adapted to draw the said pocket edges of the jacket into said grooves to secure the jacket to the rim around the tire.

No. 473,590.—*Heel*. George F. Randolph, Salem, W. Va.

The herein-described improved heel, having its under side provided with a recess the sides of which are convexed and the rubber plug having concaved sides and fitting snugly within and conforming thereto, the under side of the plug projecting below the corresponding side of the heel and the upper side of said plug being concaved to form the suction-chamber having a flexible surrounding wall.

No. 473,650.—*Rubber Shoe*. Francis C. Williams, Philadelphia, Pa.

A rubber shoe having its outer sole or wearing surface provided with a series of perforations separated from each other, said perforations being filled with a compound of rubber and grit and the whole vulcanized.

No. 473,695.—*Whip*. Friedrich P. Couse, Westfield, Mass.

A whip having a center of rawhide, a rubber tube normally

of less length than said rawhide center and applied and stretched thereover to inclose the entire length of the rawhide center and having its opposite ends held against movement on said center, plaiting applied over the stretched rubber tube, which maintains the latter in its stretched condition, sidings glued or cemented to the plaited center, and an outer covering for the sidings.

No. 473,093.—Belting.—Robert Cowen, Cambridge, assignor to the Boston Woven Hose Co., Boston, Mass.

### A Repair-Shop for Rubber Shoes.

[FROM THE "BOOT AND SHOE RECORDER." ]

I DISCOVERED a new industry not long ago. It was one of those dark, dreary, drizzly days in December, when everybody was wearing rubbers and wishing something else was as waterproof but less slippery on slimy, muddy sidewalks. It was in an inland city, two or three hundred miles from Boston. In the doorway of a basement shoemaker shop were hanging some second-hand rubber overshoes. The general seediness of their surface was intensified by the brightness and shininess of the patches which had been placed upon them. The grey appearance of antiquity and the fresh blackness of the new hardly blended into a harmonious whole.

Alert on discovering something new in the shoe business, I entered the basement. It was a stuffy sort of place, and the odor was a mixture of wood-alcohol, bisulphide of carbon, rubber and tobacco. I gasped, but the journalistic tendency overcame all fears of asphyxiation, and I hailed the presiding genius of the cellar. He was a rather portly French-German with a bad brogue, a maimed hand and a powerful pair of glasses which made his eyes appear gigantic. I cannot imitate in Roman letters his peculiar accent. Nothing but the most grotesque of German text would equal such a task. I give his story in United States language, and you can pronounce it to suit yourself. The facts are here. Never mind the embellishments.

"Yes, I sell a good many old rubbers now. I've been in this business since last fall. I notice that overshoes always wear out at the heels. The rest of the rubber will be whole, and the heel is too much altogether gone. I used to mend many rubber boots. I mended my own overshoes with cement and a sheet of rubber. Then I ask why I not may mend some others. I do so for my customers. I put the mended pair in my doorway. Then more people come in. I then go to the junk shop around the square and I buy me all the rubbers that are not too much worn out. I patch them and I sell them. I find other junk stores. I make money. I sell more. I have good business."

And he had a good business. The shoes, patched in their vulnerable points, were as durable as new, though not as good looking. The new heels, or soles were cemented on, and further improved by a row of clinch nails driven against an iron last. They were sold at about 60 per cent. of the price of new goods, and as labor, patches and cement formed the principal cost, the profit was a fair one.

### India-Rubber and Coal-Tar as a Granite Varnish.

IT is well known that stone absorbs a certain amount of water, and of the building stones, porous sandstone perhaps is the most hygroscopic. A composition used abroad for rendering building stones water-proof is thus described: Where the surfaces are to be exposed to the air a solution is made of India-rubber clippings and benzine or petroleum, into which is

Claim 1.—Belting stitched or quilted with lines of stitches, the threads of which on one side of the face extend longitudinally of the belt and on the opposite side run across or transversely of the same and within the marginal edges of the belt. Claim 2.—Belting composed of a plurality of plies of material united by lines of stitches, the threads of which stitches on one side or face extend longitudinally of the belt and on the opposite side run across or transversely of the same and within the marginal edges of belt.

stirred a proportion of coal tar. This is then put in a boiling state upon the stone and a certain amount of it penetrates the pores. Of course black absorbs a great deal of heat, and this is overcome by dusting the whole surface with some dry white powder which adheres and reflects the heat. A second method, which is for surfaces that are to be covered up, is to treat with the same compound except that the first layer is blazed up, that is the tar being held at a boiling point in its receptacle, its surface lighted and allowed to blaze fifteen minutes, being constantly stirred with an iron rod. If a drop of this is put on the stone it becomes of a consistency like sealing-wax. The fire should be stopped when the compound reaches the consistency of a thick soup, the volume of the tar being then reduced one-third. The material thus produced is then rapidly spread on with a large flat brush.

### Is Gutta-Percha Scarce?

A LEADING importer of Gutta-percha speaking of the reports as to the scarcity of that commodity, says: "Of course this country uses only a small part of what Gutta-percha is produced, and this for the very good reason that we have no such enormous cable works as England and Germany have. Cable orders recently given in England will take about 1200 tons of Gutta-percha to cover them. The statement of a certain importer that he sells only about 1500 pounds a month is surprising. If it is actually so, it is time he got out of the business. We have no trouble at all in carrying a six-months' stock of Gutta-percha, and would like to find customers for even more than that. While the stock this year in Europe of medium and low grades is the largest that it has been for six years past that for extra fine grades is low."

### Another Kind of Rubber Fiber-Ware.

A N engineer has recently gotten up a method for making laboratory utensils out of pulp that is said to be a success. One part of rag pulp is used to seventeen parts of wood pulp. The goods are made up in molds such as they use in porcelain factories, after which they are thoroughly dried. They are then packed in iron cylinders which can be thoroughly sealed and the air exhausted. While in this cylinder a liquid made of 200 parts of petroleum, 4 parts of linseed-oil, 2 parts of resin, and 2 parts of caoutchouc oil is forced into the cylinder and kept there fifteen minutes, by which time it has penetrated every part of the article. They are then taken out and put into another cylinder and treated to sufficient heat to volatilize the petroleum with which they are impregnated. When dry they are put into a vulcanizer and treated to a current of air containing a stated quantity of ozone, which oxidizes the oil that is in the pores of the pulp. The utensils are afterwards dipped in a linseed-oil and resin bath to give them a surface finish.



## LATE NOTES FROM THE RUBBER COUNTRY.

*Part Correspondence of "The India Rubber World."*

THE American steamship company, as it is called on the Amazon, certainly requires some improvement in its service. Being under special obligations to the Rio government on account of the subsidies received there, they have been neglecting Pará in the interests of the coffee and sugar growers of the southern provinces, their ships only calling here at irregular intervals on their way north or south. Pará and the rubber trade seem to be considered as of a secondary matter to them because there are no "subsidies" in it, though the rate is good. The freight rate on rubber from Pará to New York is 25 cents and 5 cents primage per cubic foot delivered in New York, equivalent to  $\frac{1}{4}$  of a cent per pound on material worth 75 cents. It is a perfectly safe and good cargo, being the most valuable of freight, next to coin, and has sustained for years two good companies. Fortunately for American trade the transportation between the Amazon and North America is well conducted by the two competing lines of the Booth and Red Cross companies. These are English companies well managed in the interests of American shippers, that have been doing a regular trade exclusively between New York and the Amazon for upwards of forty years. As American trade has been so largely indebted to these pioneers in way of regular trade with the Amazon it may be suggested here that to publish them as "tramps" in the official reports of the United States is doing an injustice. However the *Vigilancia*, of the American line, brought out on its last trip the president of the company, who goes on to Rio with the American Minister, and it is expected that he may be able to make some arrangements for the improvement of their service through the political or diplomatic intervention of the Brazilian Minister at Washington, who is reported to be quite interested in the advancement of certain American enterprises on the Amazon.

This being the dull season in rubber, just previous to the receipt of the new crop, the shipments are light. The market is quiet, the transactions being altogether those of Norton & Co., for the New York Commercial Co., who are commencing early to "bull" the market in the interest, it is said, of the new combination. They are permitted to pay a little more for their rubber than any of the old dealers will give.

Desiring to obtain the opinion of the native dealers, whose relations with the rubber trade are most intimate, by reason of their supplying the goods and receiving the output of the rubber forests, I called upon the oldest established house in this section, that of A. Berneaud & Co., "commissões e aviamentos," who have houses in Pará and Manáos. I was fortunate in meeting with Senhor J. Lucio d'Azevedo, managing partner in the concern, quite a young gentleman, intelligent and shrewd, who is recognized in Pará business circles, an English banker told me, as one of the cleverest men in the city. The firm are the old-

est in their line in this country, being the most extensive rubber receivers in Pará—a proper idea of their merit being furnished by the fact that they have been in this trade for upwards of fifty years, having been organized by the late Viscount Saint Elias.

The firm's operations have been confined principally to the Madeira river, which trade they have practically controlled, supplying the rubber-gatherers and receiving their product for sale at Pará. Their annual receipts average 1200 tons, over one half of which is from the Madeira river, one of the upper tributaries of the Amazon. The manufacturers in America well know the superior quality of the Madeira rubber, which is prepared in small cakes or packages. The annual crop of the Madeira affluents is about 1000 tons, which Senhor Azevedo thinks is not likely to increase, as the rubber forests in the Madeira have already been pretty fully explored and are liable to become exhausted. The rubber gathering in that section is more systematically conducted than on the other—or, as they are termed, free rivers. In many places the owners, realizing the danger of exhaustion, have divided their lands into sections, on only one portion of which the trees are tapped each season, thereby giving the other half an annual rest. They give to the preparation of the crude rubber for market on the Madeira greater care, which insures a better quality with correspondingly advanced prices.

About 500 tons of a good quality of rubber comes by canoes over the falls of the Madeira from the neighboring republic of Bolivia. This output pays duty at the Bolivian frontier only, and is not sold at Pará, being shipped directly to England to pay for goods that are imported likewise direct from England. There is a Bolivian house in Liverpool and London to look after the business of that all important and almost unknown rich region known as Cisandine Bolivia, which apparently is locked in by the falls of the Madeira and Mamore, but whose natural outlet is through the Amazon.

Senhor Azevedo is decidedly in advance of his foreign competitors, especially the numerous commission merchants and brokers and bankers who do a thriving trade in the manipulation of "exchange" in Pará, in that he advocates *direct dealings* between manufacturers and receivers. The general objection to this course as suggested by foreign traders is that the native receivers are as a rule *unreliable* and in numerous instances have indicated a lack of business integrity that militates against such a change in the mode of procedure. I am convinced, however, that this by no means applies to all those engaged in trade here.

In regard to the rubber trade with the United States Senhor Azevedo said:

"Until this time, manufacturers in the United States have been supplied through the medium of speculators, who control the markets both in Pará and New York.

Only two large factories, the Woonsocket Rubber Co. and the Boston Rubber Co., are making their purchases directly in Pará, but they have agents here, to whom they pay the usual commercial commission. It would be desirable that other manufacturers followed this example, and much better if they could address themselves directly to the large receivers, this being, in my opinion, the natural course of business in the near future. The conditions of the Pará rubber trade are not yet known in the United States, and speculators are naturally interested in concealing the truth from their clients. I think that both manufacturers and producers have very much to win, if the present state of things can be changed.

"Nevertheless a few of the receivers are already in connection with a large manufacturer in the United States, to whom they have made some consignments, and if the experience proves good, it is very likely that further business will be done in that line."

Referring to the United States Rubber Co. and its proposed capital of \$50,000,000, he smilingly observed:

"It has been received with some distrust at Pará, the general feeling being that a monopoly was to be established, whose influence would prove very inconvenient to our interests. An immediate fall in the prices followed, which confirmed the first impression. At present we are perfectly aware of Mr. Flint's intentions, and we don't trouble ourselves very much about the 'trust.'"

In regard to the adulteration of rubber, which is becoming quite a serious question, Senhor Azevedo says:

"Manufacturers must not exaggerate the risks of the fraud lately discovered in Pará rubber. It has only appeared in Island grades, and all the receivers are interested in putting an end to it. The fraud is a very stupid idea of dishonest gatherers, and is not to be found in up-river grades."

J. ORTON KERBEY.

Pará, Brazil, June 21, 1892.

### Wanted a Substitute for Ivory.

TO THE EDITOR OF THE INDIA RUBBER WORLD: There seems to be no question whatever that sooner or later the supply of natural ivory will come to an end. Wherever the elephant is found he is incessantly hunted for his tusks, and it is only a question of time when his fate will be that of the now extinct American buffalo. Users of ivory will then be obliged to look about for other materials, and the branches of industry likely to be affected are more numerous than is generally supposed. I should like to ask your views as to the probability of hard rubber becoming a successor to ivory to an important extent in any of these industries.

JOHN R. HAVEN.

Newark, June 24, 1892.

[THE fact that natural ivory is becoming very scarce cannot be doubted, but whether hard rubber is adapted to fill its place satisfactorily is still an open question. As far as color goes it cannot do it, as no white hard rubber has been made or ever will be made, tradition to the contrary notwithstanding. There are a variety of the products of the celluloid nature which will probably come nearer to matching ivory than anything in hard rubber. Composition balls are to-day made to take the place of ivory billiard-balls that are equal if not superior to the best natural ivory. It is said that a new glass-like material, which may be used for a great variety of purposes, has been produced by Frederick Eckstein, of Vienna. It is made by dissolving four to eight parts of collodion wool in about 100 parts (by weight) of ether or alcohol, adding 2 to 4 per cent. of rosin or Canada balsam, and drying upon a glass plate at a temperature of 120° F. The compound soon solidifies into a transparent sheet, having substantially the properties of glass. It resists the action of salts, alkalies and dilute acids, and has the advantage over glass of being flexible. It may be colored or ornamented with printed designs. The addition of magnesium chloride reduces its inflammability, and zinc white gives it the appearance of ivory, adapting it for use for cuffs, shirt-fronts, etc. In-

creasing the relative proportions of castor oil or rosin, imparts to it the toughness and pliability of leather, and it may even be made into driving-belts.—EDITOR.]

### The End of the Brunswick Antimony Co.

PROBABLY no rubber concern in the United States is ignorant of the fact that the Brunswick Antimony Co. once existed, and that they sold golden sulphuret of antimony cheaper than any other concern had ever done, and not only that, but sold more of it. They also were able to produce many beautiful colors from this metal, the best of which was what was known as Brunswick red, which was an exceedingly strong coloring matter of a vermillion shade. Further than this they devised a process for the manufacture of white oxide of antimony, which although it had no special use in rubber-manufacturing, was used to quite an extent in connection with dyeing. Considering the fact that they had a costly mine and expensive plant, that they hired the best men, it is a pity that it could not have been remunerative to the men who made such a plucky fight. There is a possibility that had they made regulus or metallic antimony at the time when its value appreciated so wonderfully that they might now have been leaders in that line of manufacture, and also have produced the sulphuret and oxide and other products as a side issue and have been exceedingly successful.

FEVER, cerebral and abdominal coils are now in frequent use in hospitals, and are among the many of the latter-day inventions in rubber which are eminently humane. The principle is to have a coil of rubber tubing which fits closely to the head or inflamed parts and then to pass hot, cold or iced water slowly through this coil, giving relief to the patient in a way that could not be reached otherwise. The coils should be made of fine tubing with an auxiliary coil on each side of the main coil for the purpose of moderating the flow, and giving a more steady and continuous action.

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